THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LV. No. 1411.] LONDON, MAY 27, 1890. [42ND YEAR. Price 6d.

WOLSTON'S Paste and Ready Mixed for Use.
Guaranteed Free from Adulteration. **TORBAY PAINTS.**
FOR GASHOLDERS, &c., &c.
The Original "Torbay Paints"
As supplied during many years to the LONDON GASLIGHT & COKE COMPANY.
Illustrated Price List Post Free.
TORBAY & DART PAINT Co., Ld.,
23, Gt. George St., Westminster, S.W.
DARTMOUTH, & BRIXHAM (TORBAY).

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PARKER & LESTER,
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THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.
WORKS:
ORMSIDE STREET, OLD KENT ROAD, LONDON.
Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES,
Manufacturing Gas Engineers.
See Advertisement, p. 1006.

CEMENT
EARLE'S
BEST
Portland Cement
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.
Office: 7, PIER STREET.
Works: WILMINGTON.
STOREAGE CAPACITY 10,000 Tons.
ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.
Telegraphic Address: "CEMENT HULL."

J. UNGAR & CO.,
Manufacturers & Patentees of every Description of
IMPROVED LAMPS
FOR
Streets, Markets, Shops, &c.
WHOLESALE DEPOT: 52, COMMERCIAL ST., LONDON, E.
We specially solicit Government and Local Board Contracts for General Lighting.

FUEL ECONOMY.
MELDRUM'S PATENT FURNACES
RAISE STEAM BY BURNING
BREEZE, COAL DUST,
AND OTHER SMALL AND POOR FUEL.
Telegrams: "Meldrum Manchester."
REALIZED SAVING UP TO
Results Guaranteed.
£200
PER BOILER PER ANNUM.
MELDRUM BROTHERS,
26, HALF STREET, CATHEDRAL YARD, MANCHESTER.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER & BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM

(ESTABLISHED 1765),

MANUFACTURER OF TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST IRON TANKS FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, and all kinds of GAS APPARATUS,

Wrought-Iron Roofs, Bridges, Girders, &c.,

Steam, Hot Water, and Range Boilers, Tanks, Cisterns, Boats, and all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, AND ESTIMATES SUPPLIED ON APPLICATION.

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EDWARD COCKEY & SONS, Ld.,

ESTABLISHED OVER HALF A CENTURY.

Gas Engineers and Contractors for the Erection of Gas-Works.

MANUFACTURERS OF IMPROVED GAS-EXHAUSTING APPARATUS.

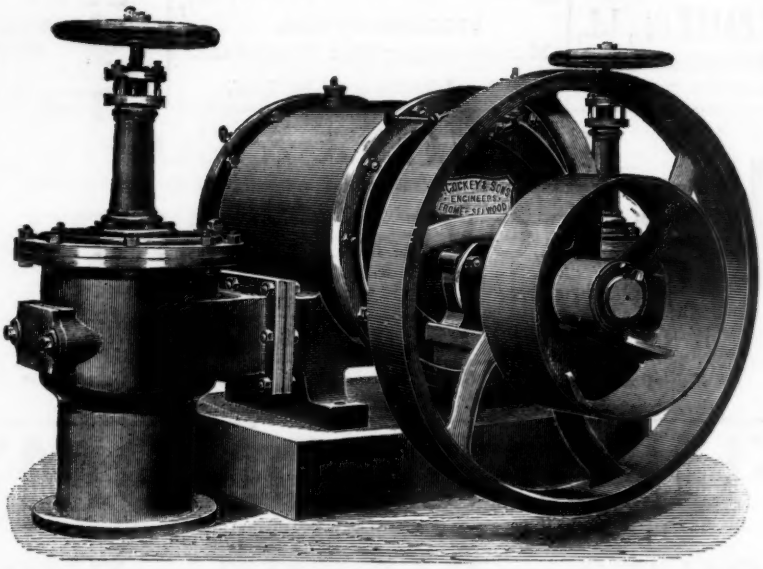
A Large Stock of Valves always on hand.

Lamp Columns; various patterns.

Wood Grids for Purifiers and Scrubbers.

Castings of every description.

Apparatus for the manufacture of Sulphate of Ammonia.



Experienced Retort-Setters constantly employed.

Lead Burning and Plumbing in all its Branches.

Gas-Fittings in great variety.

Brass Castings.

Patent Washers and Valves.

Boilers and Engines.

THE IRON-WORKS, FROME SELWOOD, SOMERSET.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.

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MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

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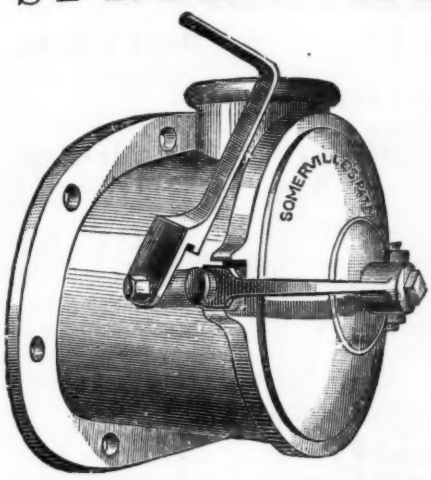
THOMAS PIGGOTT & CO.,

(ESTABLISHED 1822)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF



GASHOLDERS AND GAS APPARATUS,

INCLUDING

RETORTS AND FITTINGS, PURIFIERS, VALVES, PIPING, SCRUBBERS, CONDENSERS, WASHERS, &c., &c., &c.;

GASHOLDER TANKS IN CAST AND WROUGHT IRON;

GOLIATH, HYDRAULIC, AND OTHER PURIFIER COVER LIFTS,

ALL OF THE MOST APPROVED DESIGNS.

BOILERS, ENGINES, PUMPS, EXHAUSTERS, METERS, GOVERNORS, &c.

SULPHATE OF AMMONIA PLANT.

MAKERS OF

SOMERVILLE'S PATENT RETORT MOUTHPIECES & LIDS,

WHICH ARE SELF-SEALING AND REQUIRE NO LUTING.

Prices and further Particulars may be obtained on application.

London Offices: 14, GREAT ST. THOMAS APOSTLE, E.C.—J. E. & S. SPENCER, Agents.

ESTABLISHED 1825.

GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

NEWTON, CHAMBERS, & CO., LIMITED,

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

SLIDE VALVES, WITH RACK & PINION, OR Internal or External SCREWS, of all Sizes.

GASHOLDERS, AND Gasholder Tanks.

CAST-IRON RETORTS,

RETORT-BED FITTINGS,

And Retort-House Appliances

of every description.

Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

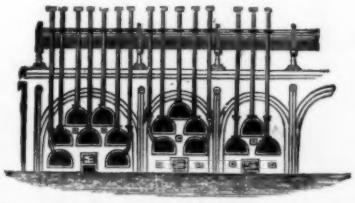
WROUGHT AND CAST IRON CONDENSERS, SCRUBBERS, & WASHERS,

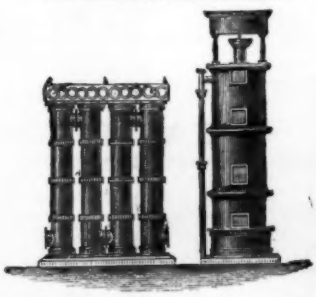
TAR AND LIQUOR PUMPS, &c.

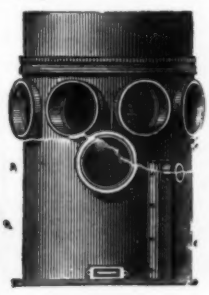
PATENT CENTRE VALVES

for working Purifiers.

Also Bye-Pass & Stop Valves.





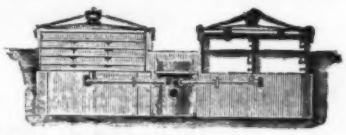


PURIFIERS with Planed Joints,

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

CROSSLEY'S "OTTO" GAS-ENGINE.

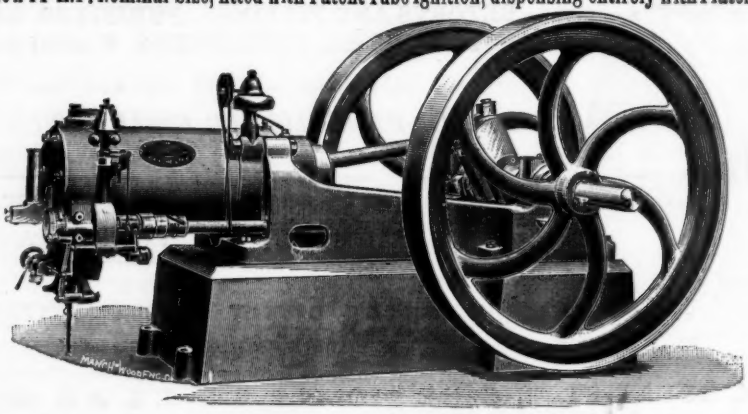
100 Prize Medals.

MADE in SIZES
2-Man to 100-HP.

GAS-ENGINES
COMBINED
WITH
PUMPS
FOR
TOWNS SUPPLY,
SEWAGE, &c., &c.

GAS-ENGINES
COMBINED
WITH
AIR COMPRESSORS
FOR THE
SHONE SEWAGE
SYSTEM, LUCIGEN
LIGHT, &c.

New 14-H.P. Nominal Size, fitted with Patent Tube Ignition, dispensing entirely with Plates.



MADE in SIZES
2-Man to 100-HP.

VERTICAL
AND
HORIZONTAL
TYPES.

ENGINES
COMBINED
WITH
HOISTS, PUMPS,
DYNAMOS, &c. &c.

Largely used for
EXHAUSTING,
PUMPING,
COKE CRUSHING,
ELECTRIC LIGHTING,
&c., &c.

Over 31,000 "OTTO" ENGINES are at work.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER,

LONDON,
LIVERPOOL,
GLASGOW,
NEWCASTLE,
BIRMINGHAM,
HULL.

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND.

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

GLAZED BRICKS AND PORCELAIN BATHS.

R. & J. DEMPSTER,

Engineers, Ironfounders, and Contractors,

GAS PLANT WORKS, NEWTON HEATH, MANCHESTER.

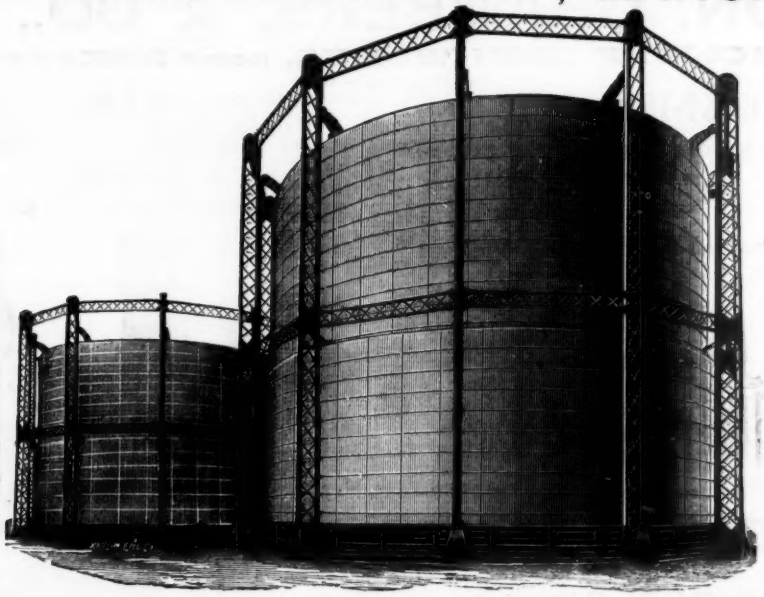


Illustration showing view of two Telescope Gasholders, each 65 feet diameter by 48 feet high, recently erected by Messrs. R. and J. Dempster, in Tanks previously occupied by Single-lift Holders 20 feet deep. The Tanks were made 4 feet deeper, by adding a Tier of Cast-Iron Plates, prepared with suitable Flanges, to meet the Brickwork of a Brick and Puddle Tank. The storeage capacity was thus increased nearly 150 per cent. at comparatively little outlay.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS OF FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

A STOCK OF DIFFERENT SHAPES ON HAND.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON AGENTS:
CXC	"JACKSON"	BECK & Co.
MARK.	CLAY CROSS.	53, QUEEN VICTORIA ST., E.C.

SULPHATE OF AMMONIA.

By Her Majesty's Royal Letters Patent.

DR. FELDMANN'S APPARATUS

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES APPLY TO THE

Sole Agents and Manufacturers,

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms–

BURT, BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
CHANCE BROTHERS, OLDBURY (4 Apparatus).
RUNCORN SOAP & ALKALI CO., Limited, RUNCORN.
NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited, SHADWELL.
WM. BUTLER & CO., BRISTOL.
KEMPSON & CO., Pye Bridge.

And to the following Gas Companies and Corporations

ILKESTON.	BURY.	CHORLEY.
WIDNES	BRIGHOUSE.	WHITEHAVEN.
HALIFAX.	MARKET HARBRO'.	CHESTER.
ALTRINCHAM.	PRESCOT.	SOUTH SHIELDS.
DENTON.	SOWERBY BRIDGE.	LEEK.
ST. ALBANS.	LEICESTER.	IPSWICH.
DUKINFIELD.	DARWEN.	BOURNEMOUTH.
NORTHWICH.	NELSON.	SALFORD.
HUDDERSFIELD.	ORMSKIRK.	LUTON.
		HAMPTON COURT.

CUTLER'S PATENT

Guide-Framing for Gasholders.

STRONG. SAFE. CHEAP.

Copy of Letter received from TUNBRIDGE WELLS GAS COMPANY.

Gas Company's Offices, Tunbridge Wells,
April 1, 1890.

Dear Sirs,

I am instructed by the Directors to express their great satisfaction with the Gasholder you constructed for this Company last year, and which is provided with your PATENT SYSTEM OF GUIDE-FRAMING.

The Engineer has reported very favourably, not only of the work itself, which is excellent, but of the merits of the PATENT GUIDE-FRAMING, which he thinks fully justifies all you claim for it.

The Directors also appreciate the liberal way in which you interpreted your obligation as to the strength of the material to be used, which, now that the work is completed, is found to be no doubt stronger than it need have been; but inasmuch as our Gasholder was the first to which the System had been applied, they think you did wisely in not reducing the material to the limits which are no doubt perfectly possible in such a Guide-Framing.

I am, Dear Sirs, yours truly,

(Signed) JOHN READ, Secretary.

Messrs. S. CUTLER & SONS,
Great George Street Chambers,
16, Great George St., Westminster, S.W.

JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

LONDON Offices & Depôts:
Baltic Wharf, Waterloo Bridge.
WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.
LIVERPOOL:
16, Lightbody Street.
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MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ESTABLISHED MORE THAN A QUARTER OF A CENTURY

WORKS
HUNSLET, LEEDS

LONDON OFFICE:
60, QUEEN VICTORIA STREET
E.C.

CLAYTON SON & CO. LTD.

MAKE A SPECIALTY OF GASHOLDERS

AND MAKERS OF
GAS PLANT OF EVERY DESCRIPTION.

REGd TELEGRAPHIC ADDRESS: "GAS LEEDS"

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

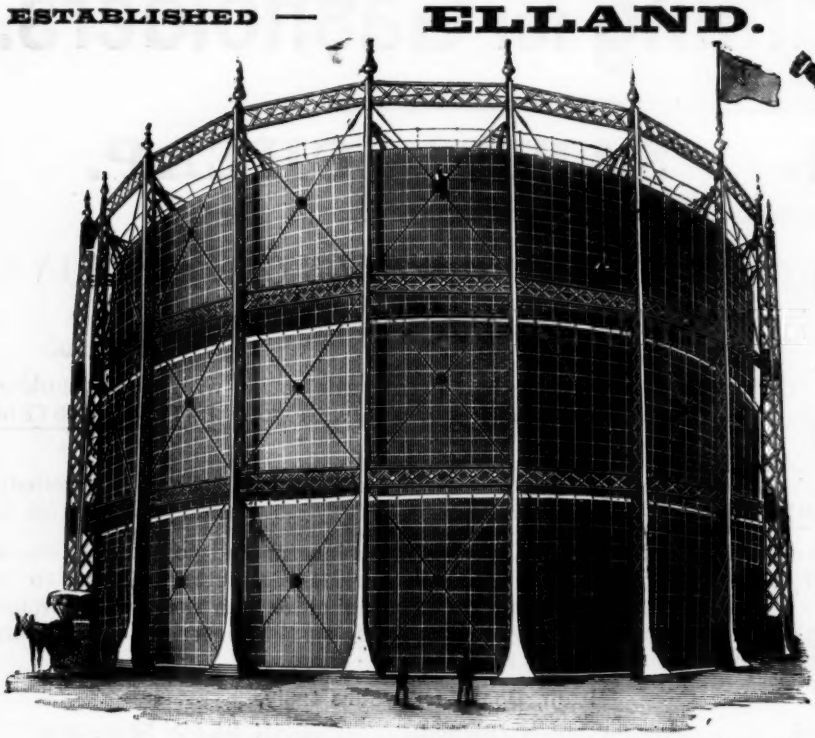
MIDLAND DISTRICT OFFICE: 22, TEMPLE STREET, BIRMINGHAM—AGENT: A. C. SCRIVENER.

TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.

R. DEMPSTER & SONS, Ltd.,

ROSE MOUNT GAS ENGINEERING WORKS,

ESTABLISHED — **ELLAND.** — 1855.



The above illustrates a TREBLE-LIFT GASHOLDER, 194, 191, and 188 feet diameter by 35 feet deep each, as made for the MELBOURNE GAS COMPANY.

GAS AND CHEMICAL PLANT OF EVERY DESCRIPTION — ALL SUNDRIES SUPPLIED.

OUR
ROTARY EXHAUSTERS
Are acknowledged to excel in efficiency and finish.

OUR IMPROVED
COKE-BREAKING MACHINE
Is a pronounced success.
See Last Week's Issue.

Designs, Specifications, and Estimates submitted on application to

R. Dempster & Sons, Ltd.,
ELLAND.

KIRKHAM, HULETT, & CHANDLER, Ld.,

PALACE CHAMBERS,

9, BRIDGE ST., WESTMINSTER.

Mr. S. HERSEY, Managing-Director. Mr. J. CHANDLER, Engineer.

THE "NEW" PATENT

"Standard" Washer-Scrubber,

As supplied to and in course of construction for numerous Gas-Works. (*See previous Advertisements.*)

Thoroughly extracts every grain of Ammonia and a large quantity of other Impurities from Gas

Has been for many months in successful and satisfactory operation at The Gaslight and Coke Company's Station at **BECKTON** (*vide* Testimonial).

The Gaslight and Coke Company, Horseferry Road, Westminster, S.W., Nov. 25, 1889.

Messrs. KIRKHAM, HULETT, AND CHANDLER, LTD.,

GENTLEMEN,—In reply to your enquiry respecting the result of putting Wooden "Bundles" into some of the Washer-Scrubbers at our Beckton Station, I beg to say that they have answered admirably for the few months they have been in; and I think them a decided success.—I am, yours truly,

(Signed) G. C. TREWBY.

Order just received for two 3 million cubic feet "Standard" Washers for the Kensal Green Station.

390 "STANDARD" WASHER-SCRUBBERS, equal to a daily capacity of **346,860,000** cubic feet of Gas, supplied and in course of construction.

The following List comprises Orders received for new "Standard" Washer-Scrubbers fitted with the improved "Wooden Bundles;" and Machines supplied in past years renewed by substituting the same in place of the "Iron Bundles":—

New Washer-Scrubbers.	Capacity in cub. ft. per 24 hours.
LIVERPOOL	3,000,000
ROCHDALE	3,000,000
LEICESTER	2,250,000
WEST HAM	3,000,000
GLASGOW	2,500,000
"	2,500,000
MELBOURNE	1,500,000
VALPARAISO	600,000
BARRY and CADOXTON	500,000
WORKINGTON	500,000
CHARLOTTENBURG	1,500,000
MAGDEBURG	750,000
ERFURT	400,000
RAWMARSH	200,000
LOWELL, U.S.A.	1,000,000
NEWTON WATER TOWN, U.S.A.	250,000
Renewals.	
THE GASLIGHT AND COKE COMPANY—	
BECKTON STATION	1,250,000
" "	2,500,000
NINE ELMS " (in part)	3,000,000
SHOREDITCH " "	2,500,000
PIMLICO " "	2,000,000
SOUTH METROPOLITAN GAS COMPANY—	
VAUXHALL STATION (in part)	3,000,000
BIRMINGHAM "	5,000,000
KINGSTON-ON-HULL	400,000
MELBOURNE	1,500,000
"	1,500,000
CROYDON	1,500,000
MAIDSTONE	1,000,000
EDINBURGH	1,500,000
WEST HAM	1,500,000

390 "STANDARD" WASHER-SCRUBBERS, equal to a daily capacity of **346,860,000** cubic feet of Gas, supplied and in course of construction.

ADDRESS AS ABOVE.

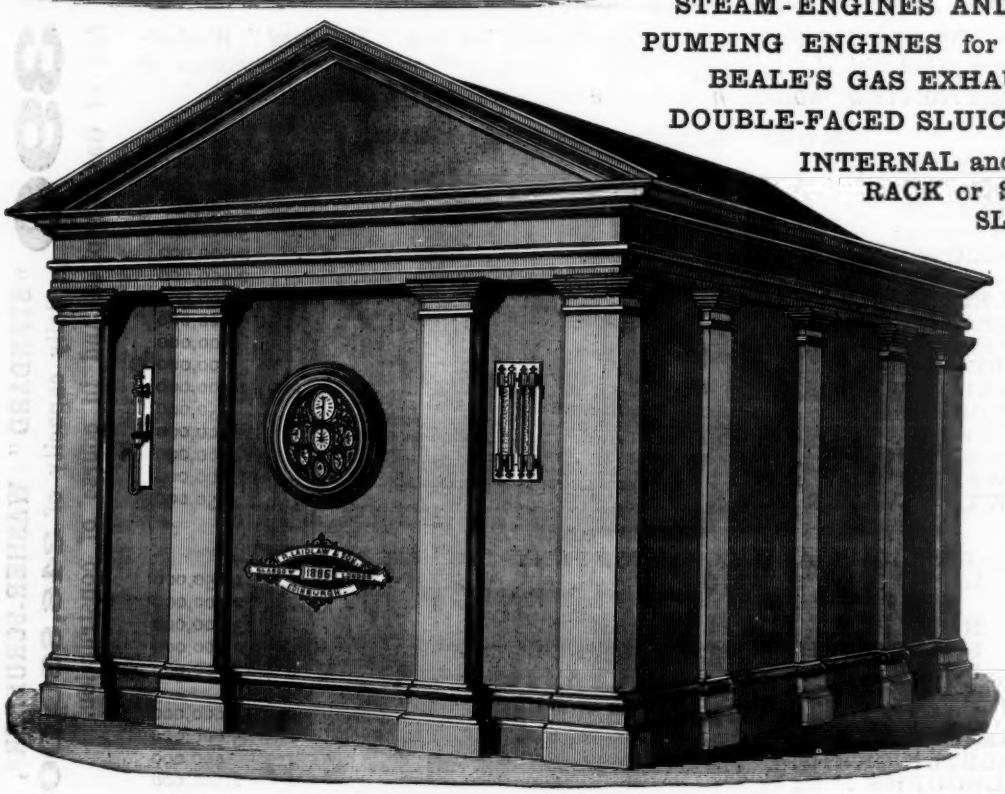
R. LAIDLAW & SON'S
STATION METERS
IN ROUND OR SQUARE CASES, ALL SIZES.

Makers in EDINBURGH of

WET AND DRY GAS-METERS,
IMPROVED STATION GOVERNORS,
PRESSURE REGISTERS,
(To Indicate New Time),
PRESSURE GAUGES, TEST HOLDERS,
EXPERIMENTAL HOURLY-RATE METERS,
EXPERIMENTAL TEST-METERS,
CONDENSER THERMOMETERS,
SIEMENS' WATER-METERS,
STREET LANTERNS,
AND ALL KINDS OF
GAS APPARATUS AND FITTINGS, &c.

Makers in GLASGOW of

CAST-IRON PIPES (all Sizes),
LAMP PILLARS,
STEAM-ENGINES AND BOILERS,
PUMPING ENGINES for Water-Works,
BEALE'S GAS EXHAUSTERS,
DOUBLE-FACED SLUICE VALVES,
INTERNAL and EXTERNAL RACK or SCREW SLIDE VALVES,
CAST-IRON COLUMNS,
BEAMS, GIRDERS, and WATER TANKS.
WROUGHT-IRON TUBES, FITTINGS, &c.



Descriptive Price Lists, Estimates, & full particulars forwarded on application.

ALLIANCE FOUNDRY, **GLASGOW.** | SIMON SQUARE WORKS, **EDINBURGH.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**

IMPORTANT TO
GAS ENGINEERS AND GAS MANAGERS:

The most Economical, Reliable, and Handy Tool for Forge Work for

ENGINEERS, MACHINISTS, TOOL MAKERS, FITTERS, FORGERS, STAMPERS, COACH BUILDERS,

AND FOR USE IN

GAS-WORKS, SMITHIES, IRON-WORKS, COLLIERIES, &c., &c.,

IS

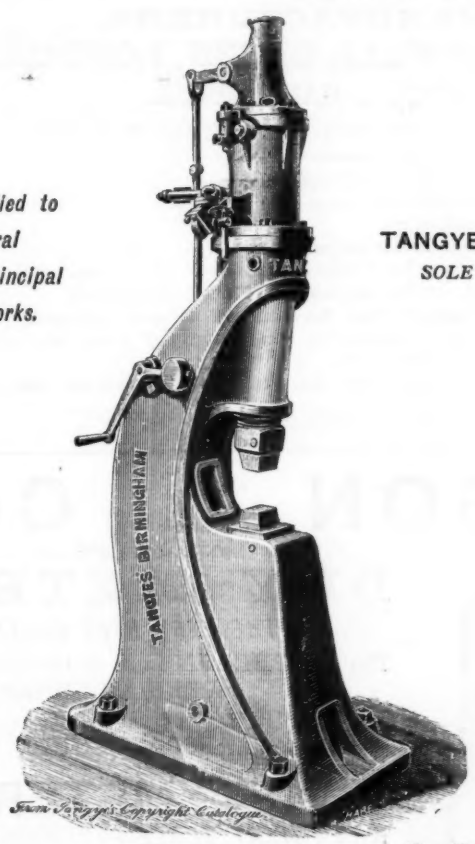
THE TANGYE GAS-HAMMER

(ROBSON & PINKNEY'S PATENTS)

As supplied to several of the principal Gas-Works.

TANGYES LIMITED
SOLE MAKERS.

As supplied to several of the principal Gas-Works.



Hand Gear.

(From Photos of the ¾ cwt. size.)

Foot Gear.

THE above illustrations represent THE TANGYE GAS-HAMMER as now made. Since its introduction it has been greatly improved both in design and simplicity of working. It has also been constructed to work either with Hand Gear or with Foot Gear.

This—the first Gas-driven Forging Hammer introduced—was designed, and at first recommended only for use in cases where steam was not available or could only be employed at great expense, but the data given below, and which are founded upon reliable and sustained test and trial, demonstrate that the **GAS-HAMMER** may be economically used in competition with the Steam-Hammer, even in places where the price of gas is at its highest.

"*Since the appearance of our* ['*The Engineer*'] *notice, the Hammer has been in some respects re-modelled, and its remarkable economy placed altogether beyond a doubt. . . . The Hammer described is that known as the ¾ cwt. size, and has a cylinder of 7 in. diameter and 6½ in. stroke. The maximum blow is very nearly that which would be given by* **a weight of 3 cwt. falling through a height of 1 ft.**; *and this can be repeated at the rate of* **110** *blows per minute. . . . Extended test in practical smith work has demonstrated that over* **2500 of the heavier blows** *referred to above, can be given with* **one pennyworth of gas** *at half-a-crown per* 1000 *feet—i.e., the Birmingham price to small consumers—or over* 4500 *varying blows for the same consumption.*"—"**The Engineer,**" **Sept. 10, 1886.**

The Gas-Hammer dispenses with Boilers, Coals, Ashes, and Dirt necessitated by Steam-Hammers.

It is ready for work at any moment, day or night, and works as economically for a few minutes' spell as when in sustained operation.

PRICE LISTS AND FULL PARTICULARS ON APPLICATION.

Tangyes Limited, CORNWALL WORKS, Birmingham.

London, Newcastle, Manchester, Glasgow, Paris, Sydney, Melbourne.

ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

And at 37, BLACKFRIARS STREET, MANCHESTER.

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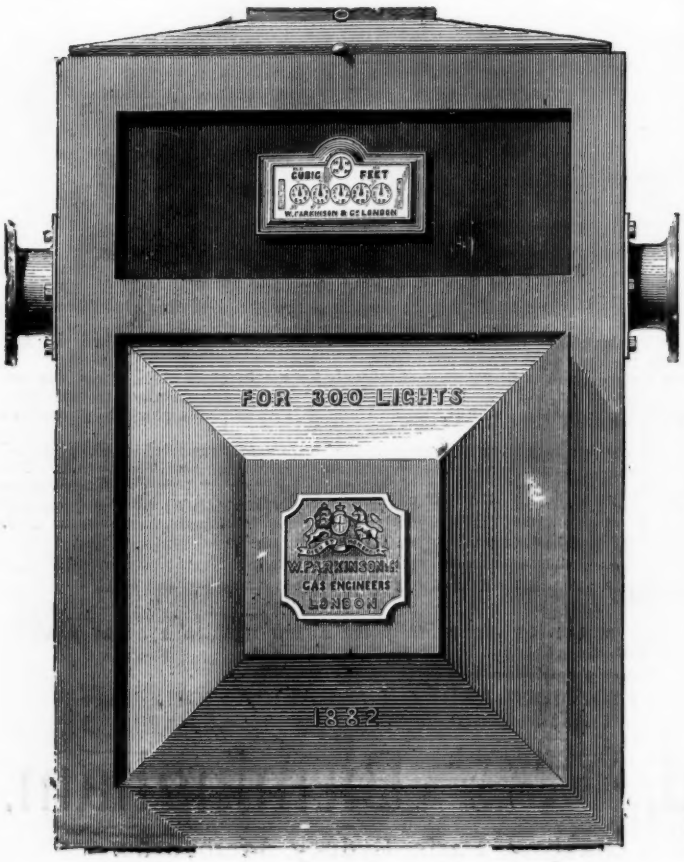

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 27, 1890.

The Question of Coal.

In another column, Mr. Mark Archer returns to the charge he has made against us of misrepresenting the circumstances that have led to the actual advance in the price of gas coal. It is gratifying to find a coal-owner so ready as Mr. Archer to discuss this question fully and fairly; and our readers will pay his arguments all the respect due to their character and origin. After all, however, the facts in question are susceptible of more than one interpretation; and we are by no means persuaded that Mr. Archer has got hold of the whole truth in regard to this matter. Of course, we did not refer to the Holmside pits when we stated that during the tight time, in the depth of winter, all sorts of rubbish was sent into the depleted gas-works. Mr. Archer is right in speaking only for Holmside, and perhaps for some other of the gas-coal pits in best repute, when he claims that nothing but fresh coal was sent out last winter. But the fact remains, as we asserted, that, wherever it came from, a good deal of dirty, stale stuff found its way into many a southern gas-works last January; and to this the managers would readily testify in our columns, only that, bad as the material was, they were glad to get it, and are not disposed to complain in person of the treatment they received in their need. Beggars must not be choosers; and strikes make gas managers acquainted with queer material, both in men and coal. As to the difference between Mr. Archer and ourselves with respect to the course to be taken by purchasers of gas coals at the present time, the point is one for those concerned to decide for themselves. Of course, a sufficient supply must be had, and necessary contracts must be entered into. What we have to consider, however, is the case of those Gas Companies whose Directors have an infatuation for contracts running for about three years. These gentlemen are to be found on the Boards of the largest as well as of the smallest Gas Companies; and some of the contracts they have power to make, mean fortunes for the lucky individuals who have opportunities for talking them over. If rumour is not more than usually unfounded, one of the largest contracts ever made for gas coal has been recently concluded at the full advance. Unless the price of coal should keep up, the gentlemen who made this purchase will look remarkably foolish, to say the least of it, when they face their constituents. We believe, in common with many other on-lookers, that it is impossible for gas coal to maintain its present value, and consider that if Gas Companies will only buy what they want for the time being, there will be a general tumble in prices before the summer is over. This is, of course, only an opinion, and is not promulgated as being worth a fraction more than appears on the surface. If any gas manager thinks that gas coal will rise in value, it will be right for him to place his contracts at current rates with anybody who will take them.

What was intended to be a fierce onslaught has been made on the JOURNAL by a leader writer in the *Sheffield Daily Telegraph*, who has tried to set out the coal-owners' side of the question, but has only succeeded in putting together a weak and windy tirade that cannot do his friends any good, or himself any credit. The writer admits that for the ensuing twelve months the Gas Companies of the United Kingdom will have to pay an average increased price of 3s. per ton for their coal, which he calculates amounts to £1,500,000 in the gross. He declares that the Railway Companies must pay another million pounds more for their coal, which makes an addition of £2,500,000 to the income of the coal-owners from these two classes of purchasers alone. Then, without mentioning how much more iron-workers, exporters, and householders will have to pay for coal, he declares that the increased wages taken by the pit hands amounts to £12,000,000. If this way of partially stating the case is not meant to insinuate that somehow the coal-owners will have to pay the large sum last mentioned out of the smaller amount put before it, the case should have been differently expressed. If it had been roundly stated that the gross amount of an average increase of 3s. a ton on the estimated total output of 170 million tons is £25,500,000, of which the miners get less than half, the argument would have been less open to question. This, however, would not have suited the writer's cause. He wanted to lead up to a declaration that "there is a federation of coal-"owners" who mean to get their own price; and he did it by putting together some strikingly unequal figures, to create the impression in a careless reader that the Federated Coal-Owners have in the past been a victimized order. This admission is all we required to justify our position upon this question. "The masters have "given up the ruinous game of underselling each other, "and, by presenting a solid front to the large buyers, are "able to state their price and get it." Just so. These long-suffering innocents have combined to rig the market;

and buyers are bidden to trust their wisdom and moderation in fixing a price which, having regard to the ostensible reason for the rise—the advance in the pitmen's wages—must be paid unquestioningly, and even with thankfulness that it is no higher.

All that need be further adduced upon our side of the question is supplied by our correspondent "Minus," who amply supports, by a clear instance, our contention that the additional money paid for coal is sifted through a ladder—all that falls through being taken by the owners, agents, or middlemen, and only what sticks to the rungs going to the pitmen in whose name it is collected. The *Sheffield Daily Telegraph* calls this part of our argument "simply ridiculous," but carefully does not bring evidence to refute it. Here, then, we have a clear case. We said the men did not receive more than 4d. or 6d. per ton of the advance. Well, it is shown to extend to 7·6d. in a certain Durham example. As, on the other hand, we only referred to a gross rise of about 3s. per ton, while the coal in question is quoted at a rise of 4s. per ton, no injustice has been done to the owners in this case. On the whole, our position with regard to this question of the rise in the price of coal has been greatly strengthened by what has come to light since we first referred to the subject. We asserted that there was a ring of owners in the district affected by the last strike of pitmen; and the Sheffield organ of the impeached class confesses to a combination among them. And the only detailed figures relating to the bearing of the recent advances upon the wages of the collier which have come to light during this controversy, go entirely in our favour. Under these conditions, we can bear with perfect equanimity the abuse of our coal-owning friends.

Lest there should be any misunderstanding in regard to this matter, it may be advisable to repeat what we said in reply to Mr. Archer's first letter, when he remarked that coal-owners have a right to combine for their own advantage if they so chose. Of course they have; and we are not so silly, for all the *Sheffield Daily Telegraph* may imagine, as to argue against their doing anything of the kind. It is as open for the coal-owners of any district to form a ring for offensive and defensive purposes as it was for them to combine in that great Syndicate, with a capital of £100,000,000, which was talked about last year, if they could have managed it. The job was too big for them, however, and the Syndicate came to nought, as the present South Yorkshire ring will do in the fulness of time. While it must be conceded that rings or syndicates are neither illegal nor impossible, it is nevertheless right to tell the truth about them and their doings. What we now allege against the coal-owners is not that they have combined to protect themselves, but that they have put forward the poor miners' dole as the excuse for their own rapacity. We are not going to arguewhether coal should or should not be 3s. or 4s. per ton dearer; for it was long ago decided that "the worth of anything is just as much "as it will bring." If coal that a year ago was on offer at 6s. 6d. per ton at the pit cannot now be had for less than 10s. 6d. per ton, then those who want that coal must pay the advanced rate for it, or go without. Do not, however, let us mistake the reason for this advance. It is the coal-owner's turn, and he is making his customers feel it. The pretence that the late advances of the pitmen's wages have been the cause of this dearness of coal is sheer impudence; and fortunate it is for the coal-owners that the truth is recognized. For if the price of coal is invariably to rise 4s. for 7·6d. paid to the men, why not pay them double, and clap on 8s. per ton? Either the rise in selling price is a natural consequence of the miners' advance, or it is not. If the former, then the miners will know what to do, being, as Mr. Archer confesses, advised by sharp and shrewd men. If the latter, then it remains to be determined what has caused the admitted effect, and whether it is likely to prove permanent or temporary. Thus we come back to the position we have occupied from the first—that the advanced price of coal is not solely or chiefly determined by the increased cost of labour or any other natural cause, but is due to temporary and unnatural influences, of which the combination of the coal-owners in certain districts is not the least effective.

The Threatened Trouble at Beckton.

Last week we published and commented upon certain proceedings of the Gas Workers' Union with regard to the working of West's wire-rope system of stoking machinery at Beckton. As the story was told to the representative of the Journal who was specially sent to ascertain the facts on the spot, it was made to appear that a higher rate of pay was demanded, without any justification, by the men engaged to work this machinery; but it now seems more than probable that all the facts did not come out on this occasion. From the communication received from Mr. Ward, which will be found in our "Correspondence" columns, it appears that the established rate of pay for machine men at Beckton is, or has been, after the rate of 5s. 9d. per shift. It does not require much acquaintance with the ways of Union leaders to understand how they would see danger to the maintenance of this rate in allowing men to do the same class of work for 5s. 4d., which is the usual pay for ordinary stoking. On the other hand, as the men who were engaged by Mr. West at the lower rate of pay were admittedly learners, he may have reasonably thought that their current pay as hand stokers would be enough for them. In the circumstances, it is a pity that matters were not fairly explained between the parties before anything like a conflict was entered upon. Mr. West may be acquitted of any intention to undermine the position of the regular Beckton machine hands; but it is regrettable that it was not agreed that when the new machine minders had learnt their work, they would be placed on the same level as any other men similarly employed. It was not Mr. West who fixed this rate of pay, but Mr. Beale, the Resident Engineer, who is not to be suspected for a moment of conniving in any underhand attempt to get men in one house to do work for less money than he would willingly pay in another. If the intentions of Mr. West and Mr. Beale have been misunderstood, morever, the manner in which the Union leaders acted cannot be excused. If the men agreed to work for Mr. West, as learners, at the same rate of pay as previously, the Union leaders should have contented themselves with making it clear, if possible, that this was only apprentice pay, and not a step towards beating down the qualified machine men's wages. If there had been any difficulty about this, the men could have been advised to refuse to work for Mr. West for longer than their agreed week. Either of these courses could have been followed without creating any fuss or anger on either side. As it is, the Union leaders have shown once more a disposition to ignore constitutional and quiet methods of carrying their point, in favour of such wholly inexcusable forms of protest as broken engagements and hobnails and brickbats. Why should a dispute between Union leaders and employers necessitate the calling in of additional constables? It is this proneness to fly to mob law and brute force that makes Union leaders so distrusted; and what do they gain by it? Their high-handed interference between Mr. West and his men at Beckton has simply resulted in depriving the gangs first selected by him of the chance of learning a less laborious manner of working, and of earning in the end a higher rate of pay. Will the men who have lost their job thank the Union men for knocking it out of their hand through a misunderstanding? We welcome Mr. Ward's communication, and assure him and all other gas workmen, both in and out of the Union, that such properly expressed representations as they may at any time desire to make with regard to matters affecting their interests will receive the same consideration in the Journal, which all their employers read, as though they came from the most powerful Director or Engineer in the whole industry. It is not our desire to act unfairly to any party or person connected with the great national industry with which the Journal is identified, but to spread the truth without fear or favour. We will not, however, countenance illegality, arbitrariness, or malicious misrepresentation in anybody, whether Director of a Gas Company or Secretary of a branch of the Gas Workers' Union. There has been enough of it all, and to spare, in the course of the deplorable labour disputes that have separated all over the country those who had once been thought to be friends; and there will probably be more, while there exists a class of men pecuniarily interested in keeping these disputes alive. Nothing of this will alter in any way whatever our determination to see fair play between man and man, and give every one his chance of a hearing. In this Beckton business, there seems to have been some mistake which ought to be rectified without very much trouble.

The Glasgow Corporation and the Partick, Hillhead, and Maryhill Gas Company.

THE last (and, indeed, only) noteworthy "fighting" Gas Bill of the session—the Partick, Hillhead, and Maryhill Company's Bill for incorporation with statutory powers and leave to apply for an electric lighting Licence—came to grief last Wednesday after a fairly good hearing. The House of Commons Committee refused to pass the preamble, even after the electricity proposal had been withdrawn; and accordingly the proprietors of this very peculiarly situated concern have to consider their position and prospects from a fresh point of view. In one sense the Company emerge from the parliamentary conflict of the session in their old position, inasmuch as they remain a non-statutory Gas Company carrying on business in a district over which the Glasgow Corporation Gas Trust have statutory powers of supply. The district, moreover, remains under independent local government; the serious attempt of the Glasgow Corporation to enlarge their administrative limits so as to include the locality mainly served by the Company having suffered defeat. For this relief the Company have reason to be thankful; because if the Corporation had become the local authority as well as the rival of the Company in the business of supplying gas, the latter would have been at their mercy. On the other hand, the failure of the Company to secure statutory rights has been placed upon record; and this historical fact leaves them distinctly in a worse position than they were before. Up to the present year they might have argued that although, as a matter of law and fact, they were without statutory authority, yet they had a moral claim to protection, which Parliament might be expected to recognize. Now they occupy the more definite, but less hopeful position of having tried in vain to obtain this protection. But apart from this consideration, matters relating to the gas supply of Partick, Hillhead, and Maryhill are much as they were before these parliamentary doings intervened in the current of local affairs. The influences that led to the establishment and development of the Company are as powerful as ever to keep the concern from being squeezed out of existence by the Corporation. It would be an outrage upon the sense of justice of the community if the Corporation, having permitted the Company to arrive at their actual position, were now to act in any way unfairly by them. Whether the Company ever had any right in law to be where they are, is beside the question. There they are doing a useful service to the community which, for some reason or other, the Corporation have not done. They can take their stand on this contention, if on no other, and argue a right to exist simply because, as a matter of fact, they do exist. If their existence is an injury to the Corporation of Glasgow, it must be through some remissness of the latter in the past. The Corporation cannot in fairness treat the Company like a farmer does a weed, which he allows to grow for a time on land that is of no particular use to him, because he knows he can grub it up at his leisure. A statutory right in gas supply must be exercised in order to be respected. The Company have established a *de facto* right to exist where they have not, and cannot obtain, *de jure* standing. It is a purely speculative right, if such a phrase is permissible; but, such as it is, the Corporation ought not to affect to deny its existence. At the same time, the Company cannot in reason pretend that their business is worth as much to a prospective purchaser as it would be if they could show a statutory title to it. During the recent proceedings, they allowed it to transpire that they would be willing to sell to the Corporation if they could obtain the Birmingham terms; but that was as absurdly exaggerated a claim on the one hand as on the other was the Corporation's offer to purchase the site of the Company's works for its value, irrespective of the purpose to which the land is put. The future relations of the Corporation and the Company cannot be based on mutual acceptance of either of these bases of valuation. It is not very probable that any outward change in the bearing of the two parties to each other will be observable, until they have both had time to digest the lessons of their late experiences.

Queen's Birthday Honours.—Among the honours conferred by Her Majesty on the occasion of the anniversary of her birthday, we notice that of a K.C.B. (Civil Division) upon Mr. H. G. Calcraft, Permanent Secretary of the Board of Trade, and knighthood upon Mr. H. Trueman Wood, Secretary of the Society of Arts.

WATER AND SANITARY AFFAIRS.

THE reply given by the President of the Local Government Board to the member for North Camberwell in the House of Commons last week, shows that the Government have some appreciation of the statutory position of the Metropolitan Water Companies. The cool proposal that a Bill should be introduced during the present session, for the purpose of suspending the powers of the Companies to make their charge for water correspond to an increase in the assessment, has been met on the part of the Government by a reference to the fact that the powers in question have been conferred by Parliament, and cannot be dealt with alone. "The matter is one," said Mr. Ritchie, "which should be considered in connection with the "whole question of water supply." The meaning of this is sufficiently obvious. While the Companies exist their rights must be respected; and Parliament must not be called upon to stultify itself. The "whole question" clearly comprehends the idea of purchase. With a fresh possessor, fresh terms may be made; though what satisfactory change can be effected in the method of charging the consumer, is by no means evident. The only possible alteration appears to consist in a general supply by meter. But even then the revenue must be maintained; or, supposing a local authority to be owners of the supply, a certain loss must be thrown upon the rates, while at the same time sanitary requirements will be likely to suffer. Mr. Ritchie, having the entire subject in view, holds out no expectation of so difficult a matter being dealt with during the present session. The Vestries, therefore, may hold their petitions in reserve, including the latest scheme from St. James, Westminster, and refrain from asking Parliament to do that which would be unjust, besides happening also to be impossible. In the meantime, we would call attention to the large reduction in certain City assessments, which has just been effected by the Commissioners of Sewers, in order to make the amounts conformable to the valuation lists of the Union Assessment Committee. The Cannon Street Hotel comes down from £3792 to £2501. Business premises in different parts decline from £650 to to £500, from £209 to £125, from £459 to £292, from £125 to £50, and others in various proportions. The rateable value being thus reduced, the charge for water must be lowered in like degree; and this will be thought perfectly equitable. But if the Companies are to give, they must also be liberty to take, if any principle is to be observed. The consumer cannot be entitled to say: "Heads, I win; tails, you lose." Yet such is the essence of the proposal put forward by those who think it a public virtue to damage the Water Companies.

The Water Inquiry Committee of the Corporation of the City of London have held a preliminary meeting, under the Chairmanship of Sir W. Guyer Hunter, M.P. The programme is understood to include an inquiry "into the "charges made for water in the City and elsewhere in "the Metropolis, and other matters incidental to the "question of water supply." Sir Guyer Hunter professes to be almost overwhelmed in the contemplation of "the great magnitude and importance of the responsibili-"ties" connected with the investigation. If the Corporation share this feeling, it would seem that they expect a good deal for their money; the proposed outlay consisting of £2000 out of the City cash. The public are reminded that a few years ago a similar inquiry was held by the Corporation on the subject of the fish supply to London, "when evidence of a voluminous and interest-"ing character was taken and published." How much or how little the public were the better for that inquiry we are not told; but if we remember rightly, an inquiry of a similar character was made at the same time by the Home Office, which may have been of even greater value, though the evidence was of a less ponderous nature. It is to be hoped that the Committee will not lose sight of the reduction in certain assessments, to which we have made reference in another paragraph. The City Chamberlain has made a statement to the Committee concerning the redemption funds that have to be lodged in his hands under the terms of the Acts recently obtained by the Lambeth, the East London, and the Southwark Companies. On this and other matters more is to be said a few days hence, when the Chamberlain will come prepared with facts and figures "very numerous and

"voluminous." What effect all this is to have, we cannot see, when viewed in the light of Mr. Ritchie's reply to Mr. Kelly the other night in the House of Commons. A certain amount of agitation is kept going; and this possibly answers a purpose, or is thought to do so. It may account in some degree for the circumstance that a King's share in the New River Company was sold by auction last week for considerably less than an Adventurer's share last July. The price, as explained by the auctioneer, may have been phenomenal in the earlier instance, as it was the first time a complete share of that kind had been offered for sale. Sentiment probably had something to do with the bargain; but a little nervousness may have operated on the recent occasion. Mr. Bousfield very properly sought to reassure the bidders at the auction, by telling them they had no reason to be alarmed; for if the County Council wanted to take the water supply, they must acquire it "on equitable terms." Yet the price obtained for the share was not in due proportion to the sum realized last year; and we may take the fact as showing that confidence in the security of a particular kind of property is not so great as Acts of Parliament would seem to warrant. An element of injustice is displaying itself, which in turn may affect other properties.

Messrs. S. Cutler and Sons have, we understand been entrusted within the last few days with further orders for their Morris and Cutler's patent condensers, to which reference was made in the JOURNAL last week. They comprise one for the Hornsey Gas Company, equal to 1,250,000 cubic feet per diem; one for the Winchester Gas Company, equal to 400,000 cubic feet per diem, and a small one for a private gas-works in Lancashire.

Effect of Subways on Gas-Mains in New York.—Giving evidence recently before the New York Senate Committee on General Laws by Mr. S. M'Cormick, Superintendent of Lamps and Gas in the Department of Public Works, said he had made the subject of gas leakage a study. He thought that when the gas-mains were first laid they were properly constructed; but since then excavations had been made all round the mains, and the mains had been injured. Subway construction had done a great deal of damage to the gas-mains.

The Electric Lighting Scheme for Brussels.—The Electricity Committee of the Brussels Municipality have completed their examination of the specifications for the electric lighting of the city. They have had five systems under consideration—viz., (1) direct distribution at low tension, (2) high tension by alternate currents, (3) high tension by continuous currents and with accumulators, (4) distribution by compressed air, and (5) distribution by water at high pressure. It is probable that the concessionaire will employ more than one of these systems, according to the exigencies of working.

"On Principle" Strikes.—A short time ago Mr. J. Stafford Ransome, Assoc. M. Inst. C.E., wrote a series of articles on "Strikes" for the *Globe*, more especially with the object of showing certain of the disadvantages of the existence of Trades Unions. Some of these articles were distributed as pamphlets among the men during the late gas strikes; and the demand for copies from employers of labour throughout the country has become so great that Mr. Ransome has determined to issue all four articles together in pamphlet form, under the title of "'On Principle' Strikes."

Illuminants Employed in Paris.—At the meeting of the International Society of Electricians in Paris, on the 7th inst., M. Fontaine, the President, read an interesting paper on the "Lighting of Paris," in the course of which he made a comparison of the amount of light used in the years 1855, 1872, 1877, 1883, and 1889, and gave the approximate figures for each source of light, such as candles, paraffin lamps, coal gas, compressed oil gas, and electricity. The consumption of tallow candles has fallen from 1,200,000 kilos. in 1855, to 800,000 kilos. in 1872, 600,000 kilos. in 1877, 400,000 kilos. in 1883, and 450,000 kilos. in 1889; whilst the consumption of wax candles during the same years was 50,000, 30,000, 35,000, 45,000, and 50,000 kilos. The calculation of the amount of vegetable oils used for lighting purposes is difficult, on account of these oils being also used in cooking, &c. The employment of mineral oils commenced about 1855, and gradually increased until 1883, since which year it has advanced rapidly. The consumption of gas during the same years was as follows:—40 million, 144 million, 150 million, 253 million, and 289 million cubic metres. Compressed gas has only recently been adopted; 6,500,000 cubic metres of it being consumed last year. Electric lighting commenced in 1877, during which year 230-horse power was in use; the horse power in 1883 was 900, and 17,400 in 1889. During last year there were 322 installations driven by steam-engines, 97 by gas-engines, 77 by compressed air, and 22 by vacuum. In addition to the 17,400-horse power actually in work, there are installations representing 10,500-horse power in course of construction.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 994.)

THE influences working on the Stock Markets during the past week have been somewhat conflicting. On the one hand, remarkably cheap money, favourable conditions of trade and traffic, assured prospects of peace, and a demand for investment have been all in favour of rising prices; while, on the other, a marked disposition to realize profits has tended to check the full measure of the upward advance. The volume of business done has naturally tailed off with the approach of the Whitsuntide recess, and is not likely to increase until after the settlement this week. The Gas Market was fairly active at the opening, and for the first few days; and several issues have improved in quotation, while none have receded. Gaslight "A" is unchanged, but closed somewhat weaker in view of threatened labour troubles at Beckton. As yet, other considerations which would influence prices, appear not to have engaged the market. The opening price on Monday was 249; and the lowest was 246 on Thursday. The secured issues remain firm and unvaried, and are fairly active. South Metropolitans have been in great favour; "A" especially being in demand. All three issues have gone up in price. A couple of transactions in the old stock at rather easier figures are all that has been done in Commercial. Suburban and Provincial Companies furnish no material for history—having had a blank week. The Foreign undertakings include considerable improvements. All Europeans have risen freely; but the higher prices have not apparently drawn any stock into the market. Bombay has made a further advance; and Monte Video has risen ½ more in view of the improved dividend. Buenos Ayres is prudently going to divide only 8 per cent. this time; having regard to the serious loss on exchange occasioned by the very high premium on gold. This, of course, is a matter which even the best managers are powerless to avoid. The Water Companies have been remarkably active. Prices all round are good; while a few quotations have risen.

The daily operations were: Gas business on Monday was mostly in Gaslight "A" and Imperial Continental, which were fairly steady. European and Monte Video rose ½ each. Dealings in Water were moderate; and East London rose 2. On Tuesday, Gaslight secured issues were much dealt in at unchanged figures. "A" was scarcely so strong. South Metropolitan "A" marked 290, and advanced 5. Dealings in Water were very brisk; but the only move was a rise of 2 in Southwark "Do" and 1 in the ordinary. Business was quieter on Wednesday; but prices were very steady. South Metropolitan "B" improved 2½; ditto "C," 3; and European, ½. In Water, Southwark "D" rose 2 more. On Thursday, prices in general for Gas were good, except for Gaslight "A." Bombay advanced ½. Water was quiet and firm. Friday was a quiet day; and all quotations remained unchanged. On Saturday, the Stock Exchange was closed.

ELECTRIC LIGHTING MEMORANDA.

American Fire Underwriters on the Risks of Electric Lighting—Uniformity of Regulation Wanted—The Central London Electrical Subway Bill—The Progress of Electric Lighting Provisional Orders.

A MEETING of the National Board of Fire Underwriters was recently held in New York, at which an interesting report of a Committee on Lighting, Heating, &c., was received and considered. This report dealt specially with the management of the various systems of electric lighting so as to ensure safety from fire. It is admitted that, when these lights were first introduced, underwriters congratulated themselves on the prospect that at last the long-sought means of illumination without danger had been found. It did not take many months, however, to discover that the electric light was not the harmless thing it had been imagined to be, "but that it was a most prolific source of danger, and its introduction has cost the insurance companies more than any other method of lighting heretofore in use." The Committee believe that in time the electric light will be made as safe as any other means of illumination; "but our knowledge of its properties and of its management must be vastly increased before that time appears." This will be considered in some quarters strange language to use in respect of a method of lighting that has been advertised for its superior safety. The point is that danger from electric lighting appliances may be, and generally is, of mysterious origin, and seems to defy precautions. "We see the danger, but as yet we are too ignorant to point out the remedy. What yesterday seemed a safe method of installation, to-day proves dangerous; and what we regard as safe to-day is likely to develop danger to-morrow. We can only wait and study." Electricians are not likely to accept these expressions as conveying the truth with regard to the fire risks of electric lighting; but it will be remembered that this is the language, not of lecturers or essayists, but of business men whose words are intended to bear a meaning in money. Last year the fire losses in the United States attributable to electric light apparatus amounted to $5,533,820.

In connection with the foregoing, it should be stated that a representative Committee is to be formed of electrical

experts, and underwriters, and delegates of electric ght companies in the United States, to frame rules for the regulation of electric light installations throughout the whole country. At present there is no general agreement on the subject of what should be the necessary safeguards against fire. Different rules are in force in various parts of the country, so that electricians hardly know what to do to satisfy the underwriters. The New York Board of underwriters have settled the matter for the time, so far as they are concerned. But their interest is not that of the community at large; and naturally where the two interests clash, they prefer their own. For example, it suits the underwriters best that electric lighting wires should be carried along the streets on poles, where they cannot set fire to any buildings; and that where transformers are used, these should also be hoisted up out of the way on poles. But such requirements have no bearing either on risks to life or on the appearance of the streets. Americans seem to be utterly careless on the last point, however; and therefore it would be foolish for fire underwriters or electricians to show solicitude in the matter.

The announcement that a Select Committee of the House of Commons had passed the preamble of the Central London Subway Bill, which proposes the construction and working of an electric underground railway from Bayswater through the line of Holborn to the City, was received by some people as a testimony to the practical success of electricity for traction and lighting. Of course, it is nothing of the sort; a condition being inserted in the Bill to the effect that it is to remain dormant until at least three months after the City and Stockwell Subway has been proved a success in practical working. All that the Bill really means at present is that if the constructors of the pioneer line of the same description make a success of it, they shall have the priority in making a similar railway which will admittedly take the cream of the local East-and-West Metropolitan traffic. A good deal yet remains to be done, however, before the antecedent condition is fulfilled. Only two of the subway stations on the City and Stockwell line are finished; and work on the others is not in a forward condition. Moreover, the arrangements for the electrical traction are not completely planned; and it remains to be seen how they will work. The first trial trip, of course, was disturbed by an unfortunate hitch; and the public will not be satisfied until it is demonstrated beyond the possibility of doubt that there is no likelihood of the cars full of passengers sticking immoveably in the tunnel between the stations until they are ignominiously hauled out by horses.

The Board of Trade have been busy with the settlement of the Provisional Orders under the Electric Lighting Acts applied for by provincial local authorities; and, as will be seen by our "Parliamentary Intelligence," on Tuesday last a large batch of these was introduced by Sir M. Hicks-Beach for incorporation into Acts in the customary way. Whether anything more will be heard of them may be doubtful; but we hold the opinion that in the majority of instances they are intended to remain a dead letter, at least for the present. While it is so uncertain whether any public electric light installation in this country can pay expenses and interest on sunk capital by lighting only, at the rates which consumers can be persuaded to pay, it would be the height of folly for local authorities to invest the ratepayers' money in speculations of the kind. There can be no compulsion on such licences under the Acts to undertake lighting at a loss. It is not a necessary of corporate life, like water supply or drainage, that must be taken in hand at any price, It must show a reasonable prospect of paying expenses, at least, or no corporation or local board ought to touch it. There are enough now trying the experiment; and the rest will wait and see whether it is worth while to employ their newly-gained powers. They have kept out the filibustering companies, and secured time to turn round and watch London, Bradford, and the West of England experimental undertakings. The Deptford difficulty must be overcome before there can be any more alternating high-potential schemes; and Bradford must make a good showing before the low-pressure system can be regarded as commercially established in this country.

The Lane-Fox Patents.—*Industries* states that the Lane-Fox Company are in negotiation with several electric supply companies for the payment of a royalty on their patents of 1d. per Board of Trade unit supplied and sold to the consumers. This may be taken as 12½ per cent. on the revenue for the next two years.

Mr. C. L. Hartley, of Middleton.—We have to announce the death, in his 42nd year, of Mr. Christopher Lister Hartley, Gas Engineer of the Middleton Corporation, which took place at his residence, in Tonge, last Friday afternoon. The deceased had been ill for a considerable length of time, but was not absolutely confined to his house until the beginning of this month. A somewhat rapid form of phthisis set in, and for upwards of a week he was quite prostrate. Mr. Hartley was appointed Manager of the Middleton Gas-Works in July, 1878, in succession to Mr. D. A. Graham; and under his care the works have given satisfaction to the Local Authority. Mr. Hartley had the respect of a large acquaintance.

THE AFFAIRS OF THE GAS INSTITUTE.

It is a long time since anything appeared in these pages under this heading; but the advertisement relating to the forthcoming Ryde meeting, which will be found in the present issue, naturally draws attention to the Institute and its fortunes, which have lain very much in the background for many months. It has always been detrimental to the utility of the Institute, in even its palmiest days, that everything connected with it goes to sleep from within a week or two after one annual meeting to within a week or two before the next. The past year has been a very momentous time in the history of the Institute, because it has been devoted (in accordance with a general understanding to that effect) to an attempt at healing the deadly wound received by the organization during the previous year. Little or no intelligence of what was in progress to this end has been made public; the notice now published being the first authoritative communication of what the reconstructed Council have been doing. Unless we are greatly mistaken, the announcement that the Council have undertaken to reconstitute the Institute under the Companies' Acts, 1862 to 1883, as a Joint-Stock Company without the use of the word "Limited" in the title, will be a surprise to many members. It will be remembered, by those who took part in the debate on the subject of the revision of the Institute rules, which was such a conspicuous feature of last year's meeting, that when the report of the then Council upon, and their recommendations as to, revision came to be dealt with, three things were done: A proposition relating to the relegation of extra-ordinary members to a lower class was postponed for twelve months; several alterations of rules for which the Council claimed urgency were carried; and consideration of the remainder was deferred for a year. It was therefore clearly the intention of the meeting that the settlement of the rest of the Institute rules should proceed on the same lines as those then dealt with, only after fuller deliberation by a properly constituted Council.

When the Council took the work of revision in hand, however, they evidently found themselves unable to stop short of the registration of the Institute under the Joint-Stock Companies' Acts. They have therefore "taken the bull by the horns," and cast the rules to be recommended for adoption by the members at the next meeting, in the form of Memorandum and Articles of Association, for registration by the Board of Trade in the manner prescribed by law. Incorporation in this manner is, for all practical purposes, equivalent to obtaining a Charter, with the advantage that it is as easy to carry out as the latter is difficult. Moreover, incorporated societies have a vast power of statute-law behind them, and the Courts will enforce their Articles of Association, which are their rules; whereas the rules of an unincorporated voluntary society are a rope of sand. In the Joint-Stock Companies' Act, besides, there is the limitation of individual liability to the amount of a subscription; while every member of a voluntary association is responsible to the full value of his estate for the acts of himself and his associates. In short, there is everything to be said for the step now advocated by The Gas Institute Council, and nothing worth mentioning against it.

It is, to all intents and purposes, a dissolution and reincorporation (with statutory powers) of the Institute, which will thereby change its status as completely as any joint-stock gas company when entering into the statutory stage of existence. That is to say, the Council, without employing the set form of words, are actually carrying out the policy for advocating which the late President, Mr. Henry Woodall, was driven to resign his position. Nobody cares about the words—it is the thing that counts; and here we have Mr. Garnett's Council consenting to a course which, if some of them had not so bitterly opposed in 1888-9, would have prevented that split in the ranks of the profession that cannot fail to be manifest at Ryde. How "the whirligig of Time brings about his revenges!" Mr. Woodall may well shake his head in regretful self-gratulation at seeing his views prevail, although in other hands, and perhaps too late to be of the service he intended. There is nothing that cannot be done with the constitution of the Institute under cover of this step. It lies with the members, if they consent to take it under the guidance of their Council, to do anything they please by way of making it a means for closing the breach that separates them from those whom they would wish to have in fellowship with them once more. There is no secret about the necessary condition to this result—the whole order of traders must be cut off from the Institute. The Council have not gone so far as this, probably because they have considered their mandate insufficient for the purpose; but it is open to any member at the forthcoming meeting to make the proposal. The Council have done something in this direction; but only enough to support the argument in favour of further change. They propose that "no further extraordinary members shall be elected," and to raise the annual subscription of the existing extra-ordinary members to two guineas, and take away their vote. Surely it would be simpler to cut loose from the whole class at one stroke. And whereas the reward of this bold action would, in all probability, be union, the consequence of the half-hearted course recommended by the Council can only be to irritate and estrange some, and reconcile none. However, this is for the members to see to when the time comes.

What the Council have done is simply to embody the relegation project of last year with a scheme for fining those who submit to it.

In thus commenting upon the proposals of The Gas Institute Council, we assume that those of our readers who are interested in the matter have the Memorandum and Articles of Association before them. We cannot print these, but can only refer to them in general terms. The relegation and fine scheme has already been dealt with; the other alterations adopted by the Institute at last year's meeting will be found in the draft, together with others of a perfectly unobjectionable character. Indeed, taken as a whole, the recommendations of the Conncil are very good, with but few exceptions. The Memorandum of Association, which sets out the objects of the Institute, is particularly full, as it should be having regard to the importance of foreseeing every eventuality in the lifetime of a company of the kind. It is quite possible that some members may have a question or two to ask about this part of the Council's recommendation; which is so different in form from anything they have been accustomed to in the rules of the old Institute. The Articles of Association contain the rules whereby the above-mentioned purposes are to be carried out. There is not much to be said about most of the rules, which are either rules of the old Institute, or such as were approved at the last general meeting. For some occult reason, the Council then proposed to burden themselves with an Honorary Secretary; and it may be judged that they are now sorry for it, since they propose to limit this superfluous official's tenure to five years at most. The powers and responsibilities of the Council are well defined. They are to be enlarged in several respects as compared with the powers of the old Council. The Solicitors for the Company (Messrs. Radcliffes and Cator), have evidently guided their clients, the Council, with care and knowledge in drafting these important documents.

It now remains to be seen what will be thought of the whole thing by the members of the Institute in general, and especially those who are in any way specially affected by the proposed changes. When this business of registration is accomplished, the Institute will be a new Institute, with fresh powers which will be useful to the members or the reverse, just as they are interpreted and used. The observation of Pope: "O'er forms of government let fools contest; whate'er is best administered is best," applies to this organization as it does to larger societies. It is one thing to make a constitution with due regard to the teachings of experience and the requirements of law; it is quite another to cause the letter to be respected in practice. The Gas Institute Council have discharged the duty imposed upon them with a boldness which may be even said to go beyond their commission, though for a very good purpose. If they have carried their supporters to the portals of the Board of Trade, whither these had little notion of going, it is for the latter to say whether the one project in regard to which the Council have taken halting steps should be recast in a more radical way. It is the last chance for the bringing about of a consummation which the great majority of present and former members of the Institute devoutly wish. Will it be taken? All can see how much depends upon the answer to this question. It may be objected that there are difficulties in the way; but to this it may be replied that the obstacles that remain are as nothing to those already faced by the Council. We believe that the Council, by their labours in this matter, have deserved well of the Institute. They may be criticized, of course, but may reasonably challenge anybody to do better amid the circumstances which limited their action. If more is needed, the same Council can be trusted to do it, provided only that the members in meeting assembled strengthen their hands. The Council have done their best; it will now be the members' turn either to declare for the conditions of reunion or of schism.

The Brin Oxygen Process.—A Company has lately been formed in Birmingham for the production of oxygen by the Brin process; and suitable premises have been secured in the neighbourhood of the Saltley Gas-Works for carrying on the work.

The Cost of Incandescent Electric Lighting.—Some interesting data relating to the comparative cost of incandescent lighting are given in the *Electrical World*, taken from carefully kept records covering the period of two years from Jan. 1, 1888, to Dec. 31, 1889, of the large isolated incandescent electric lighting plant in the basement of a well-known office building The total dynamo capacity of the plant is 2100 16-candle power lamps; but 2900 lamps have been wired in circuit, though a greater number than 2000 lamps have been in actual use at one time only on two or three occasions. The plant has been in constant operation during every hour of the 24 months, with two exceptions; the first of less than two minutes, and the second of several hours, while some change in the position of the shafting was being made. Only two armatures were injured during the two years. The total number of lamp-hours for the year 1889 was 8,831,435; and for 1888, 8,353,080—making a total of 17,184,515 hours. The comparative life of the lamps used during 1888 was found to be 3250 hours; while this average had increased during 1889 to 4464 hours. The average cost of maintaining a 16-candle power lamp for 24 hours was 3·41d. The cost during the first month—January, 1888—was 4·48d. per day; but careful management had reduced it by November, 1889, to 2·9d.

THE WORK OF THE CHIEF INSPECTOR UNDER THE ALKALI ACT DURING THE PAST YEAR.

The twenty-sixth annual report of the Chief Inspector under the Alkali, &c., Works Regulation Act, 1881 (Mr. A. E. Fletcher), was issued last week. It presents a record of the work done during the past year in carrying out the provisions of the Act; and, on the whole, testifies to a satisfactory advance in the methods employed by manufacturers to minimize the evils which are liable to accompany the development of the chemical industries. The number of works under inspection and registered under the Act last year was 903, of which 116 were alkali, and 787 other works; being a decrease of 23 and 24 as compared with the two preceding years. In addition to the above totals, there are 16 alkali, and 113 other works in Scotland (separately reported upon); making a total of 1032 registered works. The number of gas-liquor works under inspection last year was the same as before—28; but there were 12 works for the recovery of sulphur from alkali waste which came for the first time under notice. Altogether, 4921 visits were paid to works, and 4898 tests made. The average amount of acid gases escaping in the various districts is slightly less than last year—a testimony to improved conditions of working. Leaving a fuller notice of the report for a subsequent issue, we may say now that the quantity of sulphate of ammonia produced in the United Kingdom last year was 133,604 tons, against 122,785 tons in 1888, and 113,896 tons in 1887. Of the total bulk, 100,711 tons came from gas-works. Reference is made by the Chief Inspector to the rapidity with which the Chance-Claus sulphur-recovery process has been adopted, and to the resulting diminution of the amount of sulphurous tank-waste deposited about alkali works; and he expresses the hope that by the more extended adoption of the process this source of nuisance will be entirely removed. A section of the report is devoted to the subject of black coal smoke, and to the efforts now being made by the Manchester Committee (with which Mr. Fletcher is associated) to minimize its emission. The report of the Chief Inspector is, as usual, accompanied by those of the various District Inspectors.

Naphthalene as a Substitute for Camphor.—The *Oil, Paint, and Drug Reporter* points out that the extreme scarcity and high price of camphor in America have induced two or three firms in that country to place on the market a highly-refined naphthalene suitable for the preservation of woollens, furs, and other articles from the destructiveness of insects. The naphthalene is produced in several forms; the more saleable being balls, tablets, scales, and granulated. As American coal is not so rich in naphthalene as the English varieties, our manufacturers will still supply the bulk of the crude article.

Baku Petroleum.—Contradictory accounts are received from time to time as to the petroleum industry at Baku; some alarmists stating that the supply is giving out. But this, says *Industries*, is emphatically disputed by the British Consul at Batoum, who says there are no signs of exhaustion, but that in territory thoroughly explored it is now necessary to sink the wells deeper than formerly to reach the oil-bearing strata. The total production of crude oil in 1888 was 2,580,000 tons, while last year it rose to 3,306,000 tons. In the event of the territory where borings are conducted being exhausted, it is pointed out that there are other fields along the Caspian which have not yet been explored.

Theatre Lighting in Magdeburg.—In the report of the gas and water works of Magdeburg for 1888-9 some interesting details are given regarding the working of the electric light installation in the town theatre, and also concerning the life of incandescent lamps. The installation was in operation for 240 evening and 7 day performances, and in addition a small amount of current was generated each day for lighting purposes from 7 a.m. until the evening performances began. Two 40-horse power gas-engines and one of 5-horse power were employed to drive the dynamos; and during the whole period of working there was no interruption in the service. At the end of the year there were installed 160 32-candle power lamps, 356 of 25-candle power, 444 of 16-candle power, and 75 of 10-candle power; or a total of 1035. Of these 1028 were placed in the theatre, and 7 in the generating-house; whilst in the wardrobe-room were 5 hair burning appliances each taking 2 ampères. Altogether, 286 glow lamps had to be renewed. The incandescent lamps were dusted daily and defective ones replaced by new and tested lamps. At the beginning of the season in September last the corona suspended from the roof of the auditorium was fitted throughout with new glow lamps, and the old ones were used under and behind the stage. Tests were made with 40 Edison incandescent lamps supplied by the General Electric Company of Berlin, in order to ascertain their duration efficiency. The results obtained showed that five of the lamps were unserviceable, burning only 66, 433, 483, 515, and 595 hours respectively. The remaining 35 lamps lasted from 518 to 643 hours. The total expenditure during the year was £916; but of this sum the manager of the theatre paid an indemnity of £504. The total cost of the installation was £4475, or at the rate of £4 12s. 3d. per lamp installed.

NOTES.

The Value of Steam-Jackets.

The Council of the Institution of Mechanical Engineers some time since appointed a Committee to investigate the value of the steam-jacket; and their first task was to collate, with the assistance of Mr. Bryan Donkin, jun., the results of earlier experiments on the same subject. The first report of the Committee has been issued, and it contains this information, together with an elaborate statement of the results of a series of experiments specially made by Professor Kennedy for contribution to the work of the Committee. The method by which previous experience has been condensed and systematized was devised by Mr. H. Davey, Chairman of the Committee, and Mr. Bryan Donkin; and it presents at a glance the salient points of the experiments to which it is applied. The first test thus analyzed was made by two French engineers in 1846; and from that example the record is carried down to the present. The ultimate results are given as far as possible in terms of the saving of feed water per indicated horse power, by the use of the steam-jacket. The returns are very discordant, as was to be expected from their range. Many of the experiments conducted with different engines by Mr. Bryan Donkin are shown in these tables; Mr. Donkin being an enthusiastic investigator of these and similar problems of steam engineering. No attempt is made in the brief statement of the Chairman of the Committee which accompanies this report, to deduce from them the accepted value of steam-jacketing; but as this is only a preliminary publication, the whole subject may be expected to be fully dealt with in subsequent reports.

A Steel Gas-Main for High Pressures.

The Philadelphia Natural Gas Company have recently laid a 36-inch riveted steel main from Pittsburgh to Niblock, a distance of 9¼ miles; and, from its magnitude, the work has attracted much attention. Particulars of the construction of the pipe are published in the *American Manufacturer*. The pipe is made in 24-feet lengths; every length being built up of four plates ¼ inch thick, and weighing 3350 lbs. If cast-iron pipes had been used, they would have been 1¼ inches thick, and have weighed 5800 lbs. for a 24-feet length, or rather for two 12-feet lengths. The circular joints of the steel plates are single riveted, and the longitudinal joints chain riveted. The sections of the pipe are joined by cast-iron flanges riveted to the pipe and bolted together. One flange is faced flat; the other shows (1 inch inside the bolt circle) a semicircular raised rib or ring, ¼ inch high. The joints are made tight by means of two rings of asbestos rope, one on either side of the raised ring on the flange. When the flanges are drawn tightly together, the asbestos gaskets are jammed hard against the raised bead; and the heavier the pressure inside the pipe, the tighter this packing becomes. The cast flanges are made tight to the pipe by means of a groove filled with lead and caulked. This method of joining was devised by Mr. T. A. Gillespie, and was proved successful in an experimental half-mile of the piping laid for the purpose last winter. Expansion joints of the diaphragm order are provided every 350 feet apart, and boxed to allow freedom of movement. Before the main was laid a survey was made of the ground, and bends arranged for as required. Joints between the steel trunk and cast-iron branches are made in the ordinary way by socket and spigot pieces, packed with asbestos and caulked with lead. When bends of more than 10° are required, castings are employed. By the use of this description of pipe, a saving of weight of more than 900 tons per mile, and of half the joints, is obtained as compared with cast iron.

The Wastefulness of Artificial Lights.

Professor Langley has been lecturing before the National Academy of Sciences, lately in session in Washington, on "The Cheapest Light." He followed Professor Lodge's remarks on the enormous waste of energy in all artificial lights; asserting that in heating a poker to incandescence, at least 15-16ths of the weight of coal required to be burnt for this purpose is expended before the metal begins to radiate light. It is exactly as if all the lower notes of a piano had to be struck before an upper one could be sounded. Nature works in a different way; and Professor Langley gave an account of some observations on the light of the great West Indian firefly (*Pyrophorus noctilucus*) by the aid of the spectroscope, while the radiated heat was measured by Langley's bolometer. The most remarkable feature of the spectrum of the light from this insect is its shortness—extending only from F to C, and culminating in green; so that the heat-rays are wholly absent. The heat emitted with the light was insufficient to affect the bolometer by 1-200,000th of a degree C. during an exposure lasting 10 seconds. The light of a candle equalized in amount to that of the insect is from 200 to 300 times hotter. Professor Langley remarks that, in ordinary artificial illuminating, probably several hundred times the quantity of heat actually utilized as heat is wasted; most of it being consumed in heating the radiant body, whatever it is, up to its useful luminous temperature. The light of the firefly is not of vital, but merely of chemical origin. In other words, it is a simple light of combustion, which is proved by the fact that nitrogen quenches and oxygen enhances it, and the formation of carbon dioxide is a consequence of it. As regards consumption of heat, however, it is more economical than sunlight; and it is a problem of chemistry to imitate it so that the energy of fuel may, if desired, be converted at once into light, instead of being mostly wasted in the form of heat.

Rendering Iron Rustless.

The Gesner rust-proof process is illustrated in *Iron Age*, which describes it as being in successful application in Brooklyn. The plant comprises a bench of two ordinary gas-retorts placed side by side over a furnace which heats them to a temperature of 1000° or 1200° Fahr. The articles to be treated are placed in the retorts—care being taken that they do not touch one another; and they are heated with closed doors for 20 minutes. Steam is then introduced, by means of a pipe which runs from front to back of the retort, where it is open. This pipe Mr. Gesner calls a "hydrogen generator;" claiming that in this way the retort is filled with hydrogen. After the steaming has gone on for 35 minutes, half a pint of naphtha is trickled into the retort with the steam for 10 minutes. The flow of hydrocarbon is then stopped, and the steam continued for 15 minutes longer. The whole duration of the process is thus 1 hour 20 minutes. There is an outlet-pipe from the retort, sealed in water, to allow of the escape of excess gases. When the articles treated in this way are of an ornamental character, such as artistic ironwork, they are finished off in a bath of cold oil. The Brooklyn plant is rated at a capacity of 6 tons of boiler-tubes, or 2 tons of ornamental hardware per day. To substantiate his claim that hydrogen has a function in the creation of a rust-proof coating, an analysis made by Messrs. Stillman and Gladding, of New York, of a surface of treated cast iron, is cited. This analysis gives the composition of the sample as: Carbon, 1·01 per cent.; hydrogen, 0·22 per cent.; sand, 6·70 per cent.; and iron, 66·10 per cent. The treatment is said not to reduce the tensile strength of wrought iron or steel, and not to scale or chip if the metal is bent cold to an angle of 45°. No mention is made of the obvious similarity of this treatment to the Bower-Barff process in use for years in this country.

Western (U.S.A.) Gas Association.—The thirteenth annual meeting of this Association was fixed to be held at St. Louis (Mo.) on Wednesday, Thursday, and Friday last week, under the presidency of Mr. E. J. King. The list of papers gave promise of a useful meeting, as will be seen by the titles and authors—"The Relative Value of Gaseous Fuels," by Mr. B. E. Chollar; "Effects of Natural Gas Competition," by Mr. James Somerville; "An Argument in Favour of the Adoption of a Uniform System of Estimating the Cost of Gas in the Holder," by Mr. G. G. Ramsdell; "Impression of British Gas-Works," by Mr. G. T. Thompson; "Mixed Gases," by Mr. E. G. Cowdery; "Wrought Iron, Cast Iron, or Steel—Which is the best Material for Street Mains?" by Mr. E. Printz; "On the Abuse of the Patent System as Bearing on the Gas Industry, with a Remedy," by Mr. F. Egner; and "The Bye-Products of Experience," by Mr. A. R. Foote.

The Forthcoming Meeting of The Gas Institute.—According to the provisional programme of arrangements for the entertainment of the members of The Gas Institute and their friends on the occasion of the forthcoming meeting at Ryde, on the 17th prox. and three following days, the business portion of the proceedings will be tempered with a large amount of pleasure. On the opening day the members will be received by the Mayor (Mr. Alderman Barton) and Corporation at the Town Hall in the morning; and in the evening they will be invited to a smoking concert at the same place by His Worship and the inhabitants of the borough and neighbourhood. On the following day the Council of the Institute will be entertained at luncheon by Benjamin Barrow, Esq., J.P., at Southlands; and in the evening a musical entertainment will be given by the Mayor and inhabitants in the Town Hall, terminating with a dance. On the 19th, the Ryde Exhibitions and Horticultural Association, of which the President of the Institute (Mr. George Garnett) is the Chairman, will have a rose show, which will be opened by the Mayor in the Lawn Tennis Gardens at two o'clock. The band of the King's Own Yorkshire Light Infantry will be in attendance, to enliven the proceedings with music. In the evening there will be a promenade concert, and the gardens will be illuminated. The last day will be devoted to an excursion round the Isle of Wight; a break being made at Ventnor to enable the members and visitors to view the Undercliff. These are the arrangements so far made. During the meeting the members and their friends will be allowed access to the beautiful grounds of Southlands; and the Directors of the Pier Company have kindly granted the free use of the pier for those who are desirous of enjoying the sea breezes obtainable from this excellent promenade. Next month the Island will be in its brightest dress; and doubtless many of the visitors, to whom its varied attractions are only known by repute, will be desirous of becoming more intimately acquainted with them. To facilitate this, the Directors of the Railway Companies will issue return tickets at single fares to any of their stations from the Saturday preceding to the Monday following the meeting.

COMMUNICATED ARTICLE.

THE CHEMISTRY OF ILLUMINATING GAS.

By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S.

XLI.

A determined effort was made by the Patent Gas Company in 1872 to secure an increased yield and illuminating value of the gas at the expense of the lighter constituents of the tar. They adopted the process known as Eveleigh's system and worked it on a practical scale at Barnet; but, after a three years' trial, it was discarded. For a full practical description of the process, the reader may be referred to the paper read before the British Association of Gas Managers by Mr. T. R. Mellor in 1872,* and to the report of some experiments conducted upon the apparatus at Barnet by Messrs. Odling and Keates.† It will be sufficient to explain that the process as recommended by the inventor consisted of distilling ordinary bituminous coals at low temperatures in iron retorts, so as to obtain a large yield of light oily tar. This tar was heated to a temperature sufficient to drive off the lighter portions and leave a residue of pitch only; and the vapours so produced were passed through a vessel packed with charcoal, and heated to a bright red heat. The resulting gases were admitted to the inlet of the ordinary condensers, and there mixed with the gas from the retorts, being subsequently purified and stored in the usual way. The Eveleigh process, therefore, left a residue of pitch in the place of tar. At an early period in the Barnet trials, however, the iron retorts were replaced by clay ones, and the retort-house operations were brought nearly in accordance with those practised in the ordinary way. Among other difficulties that led to the rejection of the process may be mentioned the trouble from stoppage in the tar apparatus and its outlets, and especially the difficulty of regulating the quality of the gas produced from the tar.

The perusal of a paper read by Mr. G. E. Davis before the London Section of the Society of Chemical Industry in 1886,‡ on the enrichment of coal gas by certain hydrocarbons, affords valuable information on the subject of all dual processes for the manufacture of gas. By the term "dual process" I refer to systems such as that of Dr. Eveleigh, where the coal gas from the retorts is mixed with that from the tar apparatus. Mr. Davis's researches on the carrying power of hydrogen, carbonic oxide, and methane, in respect to various illuminating hydrocarbons found to be present in coal gas, are very interesting; but the paper is here alluded to because it includes a scheme for dealing with such portions of the tar as are likely to be useful to the gasmaker. Here, no doubt, the cause of previous failures is touched upon. In processes for the gasification of tar, it had been regarded too much as a whole, with the exception of Dr. Eveleigh's plan for running off the pitch; and no attention had been directed to the elimination of such parts of the tar as are now known to be useless, and indeed worse than useless, to the gasmaker.

Mr. Davis points out that the pitch, which constitutes something like 60 per cent. of the tar, yields about 25 per cent. of its weight of gas when carbonized. But this gas does not possess any light-giving value whatever, and would of course deteriorate the illuminating power of good gas if mixed with it. Any overheating of the tar would thus lead to depreciation of the gas; and this serves to explain the poor quality of gas from tar which is recorded by some experimenters. In addition to pitch, the tar contains two other substances—naphthalene and anthracene—which are of no use for the manufacture of illuminating gas. Indeed, they are worse than useless; and, if not extracted, they will cause a great deal of trouble. Mr. Davis proposed to take out these three products, and to convert the remainder of the tar into gas. Assuming that coal yielded 0·7 per cent. by weight of tar, he estimated that 0·42 per cent. of this would be removed as pitch, &c., and that the remaining 0·28 per cent. would yield 80 cubic feet of 50-candle gas per gallon, equivalent to 16,600 cubic feet per ton. The yield per ton of ordinary coal could thus be increased from 10,000 feet of 17-candle gas, to 10,465 feet of 18·4-candle gas.

The means of applying these principles in practice were simple in character. The raw tar would be distilled in the usual way; the distillate being received into three separate condensers A, B, and C, and the pitch remaining in the retort. Naphthalene would settle from the contents of tank B on cooling, and anthracene from tank C. These are removed in the usual way; and the contents of A and B are then run into a still, and treated for the production of gas. The eduction-pipe may be connected with the end of a through retort, heated to dull redness, from which the gases are collected in the usual way. Four-fifths of the oils may be vaporized; and the remaining one-fifth is returned to the raw tar. The filtered contents of tank C may be distilled, and the first fourth passed into the B tank, a further portion returned to tank C, and about one-half remains as pitch. These various operations are conducted by means of a system of three stills. Seeing that every portion of the tar is treated at least twice in the stills, after which about one-fifth of the contents of A and B, and a larger proportion of C, remain for further treatment, it is evident that the cost of manufacturing gas by this process would not be cheap. The value of the tar would have to be very low in the first place, and the cost of cannel very high, in order to afford any economy upon the ordinary plan of using 5 to 10 per cent. of cannel as a means of enriching the gas. In localities where these conditions obtain, the system might be applied with some advantage. Mr. Davis shows that one ton of tar is equal to ten tons of cannel as an enriching material; but he does not mention the fact that the cost of working the stills, the wear and tear, fuel, &c., would all be much higher in the case of the tar than with the cannel. Some return for a greater or less portion of the extra cost would, however, be afforded by the sale of the pitch, naphthalene, and anthracene.

In a paper entitled "What shall be done with our Tar?" read before the same Society at a later date, by Mr. Lewis T. Wright, some account is given of experiments tried with crude naphtha, light oil, and creosote oil obtained by the distillation of tar, as gas-producing materials. The fluids were caused to run into retorts packed with lumps of caustic lime; and the gases were subsequently passed through a second similar retort, also packed with lime. Both retorts were maintained at an orange red heat. Continual stoppages in the pipes, from accumulations of dirty naphthalene, were a chronic feature with all these oils. The best result obtained from crude naphtha was 27,100 cubic feet of 14½-candle gas per ton. Light oil yielded 30,000 cubic feet of 13½-candle gas per ton; and creosote oil 29,300 cubic feet of 8½-candle gas. These are the best from very variable results in each case; and it is noticeable that the illuminating value was not greatly increased even when the yield was very much less. Raw tar yielded 10,700 cubic feet of 12¼-candle gas per ton, but gave even more trouble from stoppages than the oils, as might be expected. Assuming that the practical difficulty of stopped pipes could be overcome, it is evident from these results that the cost of the oils must be very low indeed before they can compete with coal at its net cost as gas-producing materials.

The latest endeavour in the way of inducing the tar to yield as much gas as possible is the Dinsmore process, which differs from the others above noticed in dealing with the crude gas before the tar is separated from it. Other inventors seem to have taken it for granted that the formation of tar is an unavoidable necessity, and to have directed their attention towards dealing with it in the shape in which it is usually deposited by the ordinary methods of carbonization. Mr. Dinsmore, however, takes the crude gas, and so treats it as to increase both its quality and quantity at the expense of the tar. There is one objection to this method of dealing with the crude gas, and that is the risk of decomposing the illuminants that are already present as permanent gas. The crude gas can only be treated for the further decomposition of the tar in one way, and that is by exposure to heat; so the question for inventors to consider is whether or not they can manage to decompose the tar without at the same time reducing the intrinsic illuminating value of the product. It was this prospect of spoiling the gas, possibly, that led many of the earlier investigators on this subject to confine their attention to tar obtained in the ordinary way, rather than to seek to prevent the deposition of the tar in the first place, or at any rate that portion of it that was subsequently to be converted into gas. It is obvious that the expense of revaporizing the liquid is thus avoided. The experiments that have been tried at Widnes with the Dinsmore process, under the direction of Mr. Isaac Carr, show that, in order to treat the crude gas successfully, its composition must be practically uniform, and that the heat of the chamber (or "duct," as it is called) in which the secondary decomposition is effected must also be fairly regular. Possibly it should vary according to the kind of coal to be worked, and the circumstances attendant upon the distillation. At Widnes, the best result has been attained by taking a bed of seven retorts, and arranging that the seventh should serve as the heating chamber or duct. The gas from the other six retorts is all caused to pass through this; and a uniform composition of the gas is secured by drawing and charging one retort each hour. The inlet end of the duct is maintained at from 1700° to 1800° Fahr., and the outlet end about 500° lower. The eduction-pipe from the outlet end is cooled by means of a water-jacket, in order to prevent trouble from pitchy depositions in the pipe.

A paper on the chemistry of this process was recently read before the London Section of the Society of Chemical Industry by Mr. Watson Smith,* and the remarks made by this gentleman accentuate the fact that, in addition to the gain produced by the decomposition of matters which, in the ordinary method of working, find their way to the tar-well, there may be a loss of illuminating value, though attended at the same time by an increase in quantity, due to the partial decomposition of the permanent gas. There is no occasion to draw nice distinctions between these conflicting actions, so long as the actual result shows some advantage. And the general effect of passing the gas through the Dinsmore duct is claimed to be an increase of 10 per cent. in quantity, with a larger increase in respect to quality; while the yield of tar is reduced to the extent of one-third, and its character entirely altered. Mr. Smith ascribes the improved results to the gasification of particular constituents of the tarry vapours. The Dinsmore tar is especially

* See JOURNAL, Vol. XXI., p. 536. † *Ibid.*, Vol. XXII., p. 17.
‡ *Ibid.*, Vol. XLVII., p. 200.

* See *ante*, p. 882.

poor in light oils and tarry acids; so he believes that the aromatic hydrocarbons which constitute these light oils are decomposed into permanent gases of the olefine and acetylene series, and also that the phenols of the tar acids are reduced, first to aromatic hydrocarbons, and thence to permanent gases as above described. He also refers to the absence of carbon dioxide in the purified gas; but does not make it clear whether this is removed by the ordinary methods of purification, or whether it is actually reduced in the duct, so that the proportion of carbonic acid in the crude Dinsmore gas is notably less than that in the ordinary gas. The actual result as regards this substance is of great importance. If the Dinsmore duct really reduces it, then the subsequent cost of purification will be reduced, and a point will be scored in favour of the process; but if it should happen that the carbonic acid is increased, then there is either additional cost of purification or loss of illuminating value to be taken into account.

The present writer considered some of the theoretical points concerned in this process in a paper which appeared in these columns last year.* For full practical details, the reader may be referred to Mr. Isaac Carr's illustrated description of the process, including a report by Mr. W. Foster.† This consists of the text of a paper read before the Manchester District Institution of Gas Engineers, and followed by a discussion.

The East London Water-Works Company are inviting tenders for £50,000, being the fourth portion of their new perpetual debenture stock, to bear interest at 4½ per cent. per annum, free of income-tax.

The South Metropolitan Gas Company and the Factory Act.—Our readers will remember that in February last the South Metropolitan Gas Company were fined at the Greenwich Police Court, for breaches of the Factory Act, on summonses taken out by Mr. A. Redgrave, the Chief Inspector of Factories. The defence set up by Mr. Passmore, on behalf of the Company, was that gas-works did not come within the meaning of the Act; it being stated that the Inspectors seldom or never visited the works. The point was overruled by the Magistrate; and Mr. Passmore gave notice of appeal. We understand that the Company have now decided not to prosecute the appeal, and have paid the fine.

Awards at the New Zealand Exhibition.—In previous numbers of the JOURNAL, reference has been made to the fine collection of samples of native coal shown at the New Zealand and South Seas Exhibition at Dunedin; special mention being made of that of the Grey Valley Coal Company, Limited. We find from the list of awards that this Company have obtained several first-class awards for their various kinds of coal and coke. The Westport Coal Company, Limited, have received a special first-class award for bituminous coals. The Australian Kerosene Oil and Shale Company, New South Wales, have obtained a first-class award for their oil shales; and for samples of crude petroleum, the South Pacific Petroleum Company, of Gisborne, have gained a similar award.

The British Association.—The provisional arrangements have been made for the sixtieth meeting of the British Association, which will be held in Leeds during September next. On Monday, the 1st, the reception-room will be opened in the Victoria Hall. On the 3rd, at eight o'clock, the retiring President will resign the chair in favour of Sir F. Abel, C.B., F.R.S., who will deliver his Inaugural Address. On the 4th, there will be a *soirée;* on the 5th, a lecture; on the 6th, the usual discourse to the operative classes; on the 8th, another lecture; and on the 9th, a second *soirée.* The afternoons of the 6th and 11th will be devoted to visits and excursions to places of interest in Leeds and the neighbourhood. Dr. Glaisher, F.R.S., is President of the Mathematical and Physical Science Section; Professor Sharpe, of the Chemical Science Section; and Captain Noble, of the Mechanical Science Section.

The Rhode Island Gas Scheme.—Alluding to the defeat, in the Rhode Island Senate, of the scheme proposed by Mr. Addicks and his colleagues for starting competing gas undertakings in Providence and Pawtucket, the *American Gaslight Journal* says that, although the action of the Senate does not prevent the resuscitation of the Bill before the next Senate, it may be regarded as extremely improbable that the measure, in its present form, will ever be again considered. "In the meantime," our contemporary goes on to remark, "the greed of the Wakefield Company schemers may actually deprive them of the 'free assistance' that they so earnestly invoke in the nature of English capital. Without this latter sinew, the paths of certain speculators or traffickers in 'good gas situations in America' might have been much harder than they now are, and some of the 'good gas situations' might still be in the control of those who worked the situations up from poor to good ones. In any event, the leader in the issue of April 22 of the London JOURNAL OF GAS LIGHTING, which is based on the Wakefield Manufacturing Company's application to the Rhode Island Legislature, sounds an alarm that tends to show that English capital, or rather its controllers, can make the separation between piracy and honest business practice."

* See JOURNAL, Vol. LIV., p. 1153. † *Ibid.*, pp. 1060, 1105.

TECHNICAL RECORD.

OHIO (U.S.A.) GASLIGHT ASSOCIATION.

The Sixth Annual Meeting.

(*Concluded from p.* 837.)

After the proceedings already reported,

Mr. G. A. LIGHT, of Dayton, read a paper entitled, "The Advantages of a Combined Coal and Water-Gas Plant." He said he considered that the water-gas process was the most satisfactory method of making a high-power gas suitable for enriching coal gas. Using Lima crude oil, a 30-candle gas could be made at a less cost than by any another plan. The water-gas plant could be used to compensate for sudden increases in demand; thus avoiding the necessity for keeping extra benches under slow fire. When more than two-fifths of the total consisted of water gas, the quality could be regulated by adjusting the supply of oil to the generator; and the water-gas plant was often a good customer for the coke. It was also a good "peace-maker" to the workmen, who knew that, in an emergency, two men at it were worth twelve in the retort-house. In answer to questions, Mr. Light added that he worked 10-minute runs; blowing up for 10 minutes and making for 10 minutes, in which time from 3500 to 4000 cubic feet were produced. He could get up heat in this time with coke from Youghiogheny gas coal, but not with hard coke,

Although the paper was a short one, it led to a long discussion. Mr. Booth said that in his experience it cost as much to make water gas as it did to make coal gas; and he thought that where coal was not excessively costly, the latter gas was the cheaper. He had used natural gas, but in this case about 30 minutes were required for heating up. There appeared to be no practical difference between natural gas enriched by the use of 3 or 4 gallons of oil per 1000 cubic feet and water gas. He paid 12 per cent. on the gross receipts as purchase-money for the natural gas; and on these terms it cost about the same as water gas. Mr. Faux had tried enriching natural gas, and found that with a small proportion there was no difficulty in getting good gas, but if more than from 8 to 10 per cent. was used, the gas would be smoky and red. The least draught would blow out the gas; and after trying various expedients for two years, he had to give up the natural gas although it was cheap. After trying various experiments in the way of making gas as cheaply as possible, he was now using common slack in the coal-gas works, and bringing up the quality by means of water gas and Lima crude oil. The natural gas also caused trouble with the meters. It seemed to have an affinity for oils. It would take up liquid hydrocarbons in the mains; and it seemed to absorb the oil from the diaphragms of the meters, rendering them stiff and dry. Up to last winter he was greatly troubled with naphthelene everywhere—on the works as well as in the mains and services. Last summer he began to use crude oil, instead of benzine of 65°, and also put in a large scrubber packed with wood grids. Formerly he had not allowed the gas to fall below 65° at the outlet of the condenser, no matter what was the temperature of the air; but last winter he had allowed it to be freely cooled, and the trouble appeared to have been completely cured. He should also add that last summer an alteration was made in his superheater, which was successful in curing an obstinate disposition to stoppages just at the outlet. The Secretary, Mr. Butterworth, remarked that at Richmond (Ind.) Mr. Starr was supplying a high-quality gas, consisting of one part of natural gas to three parts of water gas, enriched by 3 gallons of oil per 1000 cubic feet. Mr. Faben thought the effect on the meters complained of by Mr. Faux was due to want of proper fixing of the gas in the superheaters. One advantage possessed by a mixture of water gas and coal gas over simple coal gas was that it was less liable to smoke. He used a combined Lowe and Granger apparatus having three cylinders, and found it very necessary to work at uniform heats. With this he could use soft coal; and a blast of six minutes' duration would produce heat enough to make gas for nine minutes. The oil was completely vaporized before being introduced to the water gas, and he had no trouble from naphthalene. Mr. Cantine had started making water gas, with the result that he was terribly troubled with naphthalene, and this while making a gas of high quality. Mr. Clark said that for some time he was in a similar position, but at last found that with a good cherry-red heat in the generator, and a straw-coloured heat in the superheater, all trouble from tar and soot ceased, and there was nothing beyond what the occasional application of steam and hot water would remove. He now made 22-candle gas with a consumption of 4½ gallons of naphtha (63°) and 50 lbs. of anthracite per 1000 cubic feet. He could not get as good quality with coke as with anthracite. Mr. Light, in replying, said he was much troubled with naphthalene in the mains, particularly in the autumn, and the remedy he employed was naphtha poured down the nearest lamp service, and steam from a portable boiler. He had also been troubled at the holder connections. In nine cases out of ten the deposit was just beyond a syphon; and it seemed impossible that 10, 12, and even 16 inch mains should stop up in the way they did. There was no apparatus that would cause more trouble than a water-gas plant if carelessly worked. The

least increase of heat would make lampblack; and if the heat were too low, there would be too much tar. He found it a good plan to draw off the thick tar from the hydraulic main after each run.

A paper describing a new coal-gas works was read by Mr. G. A. Hyde, jun., of Cleveland. They were intended to meet an immediate demand for 600,000 cubic feet of gas per day, and to be capable of extension to eight times this capacity. The exhauster and boiler house were built of full capacity for 5 millions per day, and the condenser-house for 3 millions. The purifying-house contained one set of purifiers, each 25 feet square, which were capable of dealing with 1¼ millions, and contained space for two similar sets. The washer-house was equipped with apparatus of similar power. One gasholder, having a capacity of 600,000 cubic feet, had already been put up; and a governor and valve house erected capable of accommodating the valves for the whole set of gasholders. The retort-house was built on modern lines, to admit of generator furnaces, stoking by steam power, &c.; and the connections throughout the works were 30 inches in diameter, and all exposed to view. A coal-shed, having direct communication with the local railways, adjoined the retort-house, and the furnaces at present erected were on the Klönne-Bredel plan. The condensers were on the multiple-pipe system, and comprised 24 similar divisions, any number of which could be used according to the make of gas. The condensing-pipes were all 6-inch. The works had been started since December last, and showed good promise. The consumption of coke for fuel was about 22 per cent. The retorts were 15 in. by 26 in., and 9 ft. 4 in. long, and each carbonized four-hour charges of 333 lbs. of coal per charge, yielding nearly 10,000 cubic feet of gas per retort. Several questions were put to Mr. Hyde, who, in reply, said he did not lay down a water-gas plant because he could make coal gas cheaply; but he thought of having a set. The pressure at the exhauster outlet was 11 inches, of which the washer gave from 3 to 5 inches. He could not say whether the fuel saving was sufficient to justify the extra cost of the generator furnace.

A paper on "Another Year with Fuel Gas" was read by Mr. C. H. Evans, of Jackson (Mich.). He said that a great deal of theory had been written on this subject, but there was no longer any necessity to speculate as to the probabilities of fuel gas, as within 70 miles of the place where they were then assembled there was a substantially-built fuel-gas plant, fitted with every modern appliance for reducing labour, &c., in full going order, and doing a business that ought to satisfy the most sceptical. Having noticed some of these improved appliances, the author proceeded to criticize a paper read by Mr. J. Young at the recent meeting of the American Gaslight Association,* in which estimates and conclusions were based upon experience gained in the sale of natural gas at Allegheny. He objected that no attempt was made to use the natural gas with economy. Ordinary coal-stoves were filled with broken brick, and the gas attached thereto. Results gained under such circumstances were misleading, as the quantity of gas used was three or four times as great as it need be. He went on to show that, whereas illuminating gas was only in demand for about four hours each day, fuel gas would be required for a much longer time, and that therefore a storeage and distributing plant of given size would distribute three or four times as much fuel gas as illuminating gas. Then it had been claimed that the demand for fuel gas would be more variable than that for illuminating gas; but his experience did not show this to be the case. He had some 900 consumers who not only used his gas for fuel, but also as an illuminating agent by the aid of the Fahnejelm comb. This burner would average 5 candles per cubic foot of gas burned per hour for the first 150 hours; and after that it showed a gradual diminution. He had ordinary gas-works, and supplied 500 or 600 consumers with coal gas; and the coke from the retorts was drawn direct into the cupolas and used to make fuel gas. The price of the fuel gas was 1s. 3d. to 1s. 8d. per 1000 cubic feet according to the quantity used. Bituminous coal cost from 19s. to 21s., and anthracite from 25s. to 27s. per ton. He was using Youghiogheny nut coal. As to the cost of fuel gas, he estimated it at 16s. 8d. per 1000 cubic feet of room space for the winter season. The cost of cooking-stoves ranged from 8d. to 21s. per month according to the number provided for. The coal gas was sold at 5s. 8d. per 1000 cubic feet, and its quality was 19-candle. He used Lima crude oil as fuel, and made upwards of 11,200 cubic feet per ton of coal gas, and about 20 cubic feet of fuel gas per pound of coke put into the generator. About 20,000 cubic feet of the fuel gas were equal in heating effect to a ton of coal; so that if used carefully the gas would not be more expensive than the solid fuel. For cooking it would be much cheaper. In every case he recommended that the stoves should be connected to a flue for carrying off the products of combustion.

A rather long discussion subsequently took place on the advisability of establishing a Committee on Legislation, for the purpose of looking closely after all matters affecting the interests of gas companies, such as the action of municipal authorities in regard to competing undertakings, or to acquiring possession of gas and electric light concerns. Mr. Foote, the Chairman of a similar Committee appointed by the National Electric Light Association, was present and gave an account of the proceedings taken by his Committee, which had collected full information concerning the law and practice in different States, and thus was able to completely post members requiring information in regard to any subject. In the result, Messrs. Steele (Sandusky) and Wilkiemeyer (Portsmouth) were appointed a Committee on Legislation.

Several matters in the "question-box" were put before the meeting, and discussed; and the meeting closed with the usual votes of thanks to the President and to he Secretary.

* See JOURNAL, Vol. LIV., p. 923.

THE LANGEN-LUX GAS-PRESSURE INDICATOR.

Some time ago, Herr J. G. H. Langen drew attention in the *Journal für Gasbeleuchtung*, to an apparatus he had devised, called a "single-stem gas-pressure indicator." The instrument was adopted by Herr F. Lux in his works at Ludwigshafen, and found to be very convenient and useful. It had, however, a few defects, which this gentleman remedied; and the improved form, which is shown below, was recently described by him in the above-named publication.

The apparatus is so constructed that one of the tubes is of considerably smaller diameter than the other: so that, when in use, if the level of the liquid in one is altered by the pressure of gas in the other, the rise or fall will be in inverse ratio to the diameters of the tubes. For instance, if one tube has a diameter of 1, and the other a diameter of 39, a pressure (say) of 40 mm. will lower the level of the water by 1 mm. in the larger tube, and raise by 39 mm. that in the smaller tube; and in this proportion of 39 : 40 the pressure will be shown in the latter tube. Consequently, 97·5 per cent. of the measured pressure is in the smaller tube; and 2·5 per cent. in the other. If a scale were made in which 97·5 mm. were divided into 100 equal parts, the variations in the height of the water-level in the larger tube might be left out of consideration, and the indications on the smaller tube read to ascertain the actual pressure. It would not be difficult to go so far, in proportioning the diameters to each other, as to attach a millimetre scale to the small tube, and with a proportion of 1·200, the error would not exceed 0·5 per cent. But in that case it would be preferable to replace the water now used for filling the pressure indicator by petroleum, which on account of its lighter specific gravity would require a larger scale, to the extent of about 25 per cent. This would allow of less difference in the diameters, and of making the scales accordingly.

The defects which Herr Lux found in the apparatus consisted in its rather large dimensions and its somewhat unsightly form, as well as the "sweating" produced by the continual oozing of the petroleum at the place where the glass tube was fixed in the reservoir. Then the large diameter of the glass tube prevented the exact reading of the paper-scale fixed behind it. He therefore ordered a glass-blower to reconstruct the whole apparatus as far as the screw; and its improved shape is here shown. The wide glass bulb has an inside diameter of about 30 mm.; the tube in which the liquid ascends (one of about 5 mm.) has, therefore, a proportionate diameter of nearly 1 : 36. The scale is marked on a small boxwood board, 20 mm. in width, provided with a groove along its whole length, and so fastened to the tube for the ascending liquid as to allow it to slide easily up and down that tube. The latter tube is funnel-shaped at the top, in order to facilitate the insertion of the petroleum, which must be poured in so as to leave the zero mark, which is at the bottom of the scale, at from 2 to 3 mm. below the surface of the petroleum. This orifice may be closed with a small plug of cotton wool laid in loosely.

The advantages of using petroleum instead of water may be specified as follows:—(1) Petroleum remains perfectly fluid in all variations of temperature; (2) it has a lower specific gravity, and consequently admits of greater correctness in the reading of the scale; (3) its use is unattended by the formation of vapour films, which, by making the glass tube dim, render the reading more difficult; and (4) it mixes easily with any oily or tarry substances that may accidentally enter the tube. To fill one of these pressure indicators, only about 10 grammes (12·5 cubic centimetres) of petroleum are required; and Herr Lux finds the evaporation to be so trifling that the instrument can be used for a twelvemonth without requiring any attention.

The lower end of the indicator is fitted into a brass stem, which is screwed into a small tap; so that the apparatus can be easily fixed to any part of a gas-pipe.

Mr. Arthur Graham, Manager of the Lymm Local Board Gas-Works, has received the appointment of Manager of the Hebden Bridge Gas Company, rendered vacant by the resignation of Mr. J. U. Blackburn. There were some 120 applications for the appointment.

REGISTER OF PATENTS.

Manufacturing Heating and Illuminating Gas.—Loomis, B., of Hartford, Conn., U.S.A. No. 9279; June 4, 1889. [11d.]

This invention—an improvement on patent No. 15,983 of 1888—relates to the manufacture of illuminating gas by producing a cheap high-grade heating gas, and then carburetting and enriching it with hydrocarbon oil or vapour, and finally combining and fixing the carburetted gas in heated retorts or brickwork flues.

The patentee proposes to make two kinds of heating gas—first, producer gas, resulting from the combustion of coal or other fuel with air, which gas is used for heating the carburetting retorts or brick carburetting chamber, and steam-boilers; and, secondly, water gas, resulting from the decomposition of steam in contact with the incandescent fuel, which gas is carburetted with hydrocarbon oil or vapour in manufacturing the illuminating gas. In the operation of heating the fuel to incandescence and making producer gas, the air is drawn into the furnace, and down into the body of fuel, by an exhauster connected with the base of the generator furnace; thus causing a down draught. By the operation of the exhauster, air is drawn into the furnace at the top, and down into the ignited fuel; and the resulting gases are drawn off at the bottom of the furnace. In this way a number of advantageous results are claimed to be produced, as follows:—First, dust and ashes are blown or drawn into the ash-pit, and the formation of clinker almost prevented; second, the oily and tarry vapours distilled from the top layers of freshly charged coal are caused to pass down into the heated coal below, and are thereby converted into fixed carburetted hydrogen gas, instead of passing off at the top, and being condensed into tar of little or no value; third, cheap low-grade fuel (such as bituminous coal slack, or mixture of bituminous and anthracite slack or coke dust, &c., can be advantageously used and more rapidly and uniformly gasified; fourth, the furnace can be much more rapidly charged, and the fresh fuel so placed as to prevent the formation of channels through the bed of fuel, since the attendant can readily work over the top of the furnace and inspect its interior through the fuel opening, by reason of the smoke and gases being drawn away from the top opening and down through the charge by the exhauster.

The highly-heated producer gases are passed from the base of the generating furnace through a tubular or other cooler, and their heat utilized for heating water or air; thus cooling the gases to such a degree that they will not injure the exhauster in passing through it. In this way provision is made for economically manufacturing water gas when using bituminous or soft coal or slack, partly by reason of the down draught used (with the results above mentioned) in heating the coal to incandescence, preparatory to decomposing steam, and partly by reason of passing the hot water gas out of the bed of fuel at a considerable distance below its surface, and then out of the furnace, whereby the injurious melting and caking of the fresh layers of coal at the top are prevented, and the oily and tarry vapours evolved from the fresh coal are caused to pass downward into the hot fuel below, where they are converted into a fixed rich hydrocarbon gas, which mixes with the water gas as it passes into a circular flue and out of the furnace. When the highly-heated water gas is passed up entirely through the bed of soft coal or slack, it produces much trouble by melting the fresh coal and causing it to cake; but by passing the hot gas off below the top of the fuel bed, these difficulties are overcome. The fuel, too, is evenly distributed around the side walls of the furnace; and this prevents the formation of channels and the passage of air, steam, and gases through the channels along the walls. The air and gases are also drawn away from the side walls by constructing a solid hearth or floor next to the walls at the bottom of the fuel chamber, so as to form a contracted grate opening at or about the central portion of the hearth.

It will, of course, be understood that the water gas is generated intermittently; one period being used for heating the fuel by the air draught—during which time a large volume of valuable producer gas is given off—while the next period is used for decomposing steam in contact with the incandescent fuel for the production of water gas composed of hydrogen, carbonic oxide, and carburetted hydrogen. The water gas is thus partly carburetted or enriched with carburetted hydrogen distilled from the coal, and should be a more valuable heating gas than water gas made in the ordinary way. The inventor also provides for thoroughly atomizing the hydrocarbon oil, so as to form a vapour, and intimately mixing such vapour with the hot water gas to be carburetted, by means of a rotary mixing apparatus; and then he converts the hydrocarbon vapour and water gas into a homogeneous fixed gas, by passing them first into retorts or flues at a comparatively low temperature, and thence on through other retorts or flues of an increasing temperature, whereby the oil vapours are gradually expanded and converted into fixed gas and combined with the water gas, without danger of being burned and converted into lamp-black.

The generating furnace is built preferably of fire-brick covered in the usual way with an outer iron jacket, and provided at the top with a fuel-opening closed by a lid. A conical coal distributor, in two parts, is used to direct the coal to the side wall of the furnace, where it is apt to burn away the fastest, so that the fuel will lie at the top in a dish-shaped form. An inclined hearth or floor extends inwards from the walls, and is formed with a central opening, into which the grate may be set. The ash-pit is of about the same horizontal dimensions as the grate opening; having a brick or tile floor supported on parallel division walls built in the wide outlet flue in the base of the furnace, and forming a superheater. A passage-way leads from the ash-pit into a flue, and a take-off pipe, having a valve, connects this flue with the base of a retort furnace, from which a pipe leads to a cooler. As an alternative arrangement, the generator may connect directly with the gas cooler.

In the construction of large generating furnaces, which are made from 8 to 12 feet in diameter, the patentee preferably forms the ash-pit with its outer walls contracted, and of much less diameter than the fuel chamber, so that bars may be readily run up into the fuel through the contracted opening in the circumferential hearth, for shaking down the ashes and spent fuel. When the furnace is thus constructed, with a contracted ash-pit, the main part of the furnace is partly supported upon pillars. With this construction, the bricks or tiles are set in a flue leading to a cooler.

The flue for the producer gas may lead directly from the base of the generator to the base of the retort furnace, where it connects with a combustion chamber. Air, admitted through a passage, flows into the gas through the perforated partition, causing combustion in the chamber; and the flame and products of combustion pass through a perforated partition up into the furnace, and around the retorts. Hot producer gas may be passed alone, and without being burned, up around the retorts for heating them, and thence through the cooler to the exhauster, by means of which they are drawn off, and forced either through a pipe to a steam-boiler, or through a pipe to be mixed with water gas if desired. Or the producer gas may be drawn by the exhauster from the base of the generator to the base of a brick carburetting chamber, where it is burned by the admission of air supplied through a suitable pipe. Or, again, the producer gas may be passed to the combustion chamber in the retort furnace. Air also flows through the burner to the combustion chamber for burning the gas and heating the retorts.

The retorts are made of iron, and are provided at their rear ends with necks which are set in openings in the rear wall of the furnace. These necks are provided with plugs; while the openings have caps or other stoppers for convenience in setting the retorts in the furnace. The necks are free to slide in the openings, so as to permit of expansion and contraction of the retorts. The retorts are provided with horizontal partition plates; and they are connected in vertical series by pipes having openings for inserting a scraper or cleaning bar. Carburetted water gas is admitted from a rotary mixer to the top retort; and the fixed illuminating gas is passed off from the bottom retort.

Instead of the retorts above described, a carburetting chamber may be used provided with brick flues. The walls of the chamber are built of brick, covered with an iron jacket; and it is provided with a central brick partition wall, which extends only through part of the diameter of the chamber, and serves to strengthen the chamber and support the partition plates. A transverse bridge-wall is formed in the combustion chamber at the base of the carburetting chamber; and at the front side of the combustion chamber, two bridges are formed, and provided respectively with ports. An air-pipe opens into one set of ports, and the gas-supply pipe into the other set; and the air and gas are supplied to the combustion chamber through these adjacent rows of ports. The horizontal partition plates extend alternately from opposite sides of the carburetting chamber nearly across it, so as to leave passage-ways between their free ends and the wall of the chamber. The partition plates form flues between them; and the flues connect with each other alternately on opposite sides by passages. The brick flues, of course, take the place of the carburetting retorts described above.

The rotary mixer used is provided internally with numerous blades connected with the central shaft like a fan blower; and it is connected with a small motor. The hot water gas and a small stream of oil flow together into the mixer; and, by means of the revolving blades, the oil is thrown into fine spray or vapour, and thoroughly mixed with the water gas. The carburetted water gas then flows into the retorts or brick flues, to be therein combined and fixed.

In order to make illuminating gas, the producer gas which is drawn from the base of the generator is conducted to the base of the retort furnace, and there burned by the admission of air for heating the retorts. The lower retorts will be most highly heated; and those above will be heated to a gradually decreasing temperature to the top of the furnace. The water gas is passed from the generator or holder into the rotary mixer, into which the hydrocarbon oil is at the same time admitted from a tank. The mixer is made to rotate, and it beats the oil into fine spray or vapour, and thoroughly mixes it with the water gas; and when the water gas flows hot from the generator, it aids in vapourizing the oil. The mixed water gas and oil vapour pass from the mixer into the upper retort, where the heat is lowest; and then successively pass through the retorts below, in which they are subjected to an increasing temperature, till they are combined and converted into fixed illuminating gas, which flows successively through a scrubber and purifying boxes to the holder.

Globe or Shade for Gas-Lights.—Foley, W., of Osborne Terrace, Clapham Road, S.W. No. 3761; March 10, 1890. [6d.]

The essential feature of this invention is the formation of a corona integrally with the upper part of a globe, having (by preference) outwardly sloping walls. The corona is so devised as to prevent the ascending hot air from rebounding upon the flame—a serious defect in former globes closed at the top. Around the lower part of the corona are formed a series of air holes of oval or other suitable shape; and it is particularly owing to the capacity of the corona that the air is said to be immediately led out through the holes without its being able to rebound upon the flame.

Liquid Meters.—Lacoste, J., of Paris. No. 4393; March 20, 1890. [8d.]

This invention relates to that class of liquid meters in which a piston is moved to-and-fro in a cylinder by the pressure of the liquid flowing through (such motion being imparted to registering mechanism); and the present improvements have for their object to simplify the construction of such meters, and to afford an exact measurement of the liquid passing through, however small the discharge may be from the discharge-pipe connected to the meter.

The meter is constructed with a single cylinder; the liquid being made to pass in alternately at opposite ends, and the flow being controlled by a combined arrangement of valves, actuated by the piston at the end of each stroke. For this purpose, the cylinder contains (at a certain distance from each end cover) an open diaphragm, on which are pivoted levers having eyes through which pass freely the ends of the piston-rod. The ends of the latter have heads which, at the end of each stroke, alternately act upon the end of the respective lever, pressing it inwards against the action of a spring, which tends to move it outward again when relieved of pressure. The covers of the cylinder

have central hollow extensions for the ends of the piston-rods to work to-and-fro in. In the wall of the cylinder, at one side, are formed two opposite longitudinal passages, communicating with the branch supply and discharge pipes respectively. These passages open at each end into the cylinder at points flush with the outer faces of the open diaphragms; and they are closed by ball valves, seating on caoutchouc fitted in the ends of the passages. The two ball-valves at each end of the cylinder are connected to the ends of a sway-beam pivoted at its centre on the diaphragm; so that, when the one valve closes upon its seat the other one is moved away from its seat by the sway-beam. The two valves at the opposite ends of one and the same passage are also connected together by a rod passing through the passage; and therefore, when the valve at the one end closes on its seat, it at the same time pushes the opposite one open. Thus all four valves always move together. On the perforated diaphragms are mounted sliding locking-bolts, which are urged by springs to project between the one end of the sway-beam and the diaphragm, when the valve at that end of the beam is open, and which thus locks the beam and its two valves in that position, until the end of the stroke of the piston is in the direction towards that end, at which time the piston is made to press on the one end of a pivoted arm, the other end of which takes into a slot in the sliding-bolt, and is thus made to force the bolt back so as to free the sway-beam.

The action of the apparatus is as follows:—Assuming the piston to be commencing its stroke to the right, the head of its piston-rod at that end frees the first-mentioned lever, so that it can be acted on by its spring, and press with its other end upon the sway-beam, so as to reverse the position thereof and of all the four valves when otherwise permitted to do so. When the piston commences the stroke, the discharge-valve on the right-hand end is open, and the supply-valve is closed; while at the left-hand end, the supply-valve is open and the discharge-valve closed. At the same time the sliding-bolt at the left-hand end, which was held in the withdrawn position by the pressure of the piston, is now relieved of pressure; and consequently it springs forward underneath the sway-beam at the supply-valve end. This locks the valves in the position into which they have been moved. As the piston approaches the right-hand end of its stroke, it acts upon the pivoted arm so as to withdraw the locking-bolt; and the left-hand end of the piston-rod also presses upon the left-hand lever, causing it to release the left-hand sway-beam. The right-hand lever is now free to act on its sway-beam, so as to reverse the position of the valves; and the piston commences its stroke to the left.

The motion of the piston may be imparted to the counter mechanism in any suitable manner—such as by causing it, at the end of each double stroke, to press upon a spring rod, connected by an arm to a spindle passing through a stuffing-box of the counter casing, so that the spindle is slightly turned at each double stroke, and thereby imparts motion within the casing to a pawl and ratchet gear that works the counter.

APPLICATIONS FOR LETTERS PATENT.

6910.—Dorrington, A. A., and Coates, H., "Improvements in gas-engines." May 5.

6912.—Fielding, J., "Improvements in gas motor engines." May 5.

6975.—Dempster, A. M., "An improved indicator for gasholders, reservoirs, and tanks; also applicable for other similar purposes." May 6.

7177.—Mewburn, J. C., "Combined gas and compressed air motors." A communication from R. Proell, O. L. Kummer and Co., and E. Fischinger. May 8.

7184.—Edwards, C. H., "Improvements in the manufacture of gas-retorts, drain-pipes, and other earthenware or clay-ware." May 8.

7252.—Lindsay, R. C., "An improved process for the manufacture of illuminating gas, and apparatus therefor." May 9.

7277.—Cruikshank, G. M., "Improvements in the manufacture of gas for illuminating and heating purposes, and application thereof." A communication from J. C. Reissig, J. Landin, and P. F. Maccallum. May 10.

7335.—Cruikshank, G. M., "Improvements in incandescent lighting by means of calefacient gases, and in apparatus therefor." A communication from J. C. Reissig, P. F. Macullum, and J. Landin. May 12.

7420.—Coke, A., "Measuring the intensity and value of light, to be called 'Coke's photometer.'" May 13.

7480.—Darwin, H., "Improvements relating to lamps." May 14.

7498.—Jelley, W., and Slater, J., "Improved gas regulator for overcoming an unnecessary consumption of gas combined with a smokeless and noiseless burner." May 14.

7507.—Thompson, W. P., "Improvements in and appertaining to automatically lighting and extinguishing gas-jets." A communication from M. Defraigne. May 14.

7519.—Renaud, R. M. L. G., "Improvements in liquid-meters." A communication from J. Lacoste. May 14.

7521.—Siemens, F., "Improvements in regenerative gas-lamps." May 14.

7569.—Poidevin, T. le, "Apparatus for producing air gas." May 15.

7616.—Pease, E. L., "Improvements in the means or appliances for guiding and controlling gasholders." May 16.

7620.—Fletcher, T., and Clare, A., "Improvements in and connected with gas-ovens." May 16.

7703.—Shields, T. F., "Improvements in the means or method of lighting street-lamps." May 17.

Railway Rates on Coke.—The Railway Freighters' Association of Staffordshire last Friday received a reply from the Midland and the London and North-Western Railway Companies on the question of railway rates on coke. The Association have applied before to the Board of Trade for a reduction of the rate for coke from Derbyshire into Staffordshire, which is 3d. higher than from Derbyshire to Northamptonshire. The Railway Companies have decided to reduce the rate 3d. per ton from June 1 to all firms purchasing 500 tons per month.

CORRESPONDENCE.

We are not responsible for the opinions expressed by correspondents.]

Coal-Owners and the Rise in Coal Prices.

Sir,—I feel reluctant to intrude myself on your space a second time, but two or three things mentioned in your article on "Coal and Coal-Owners," in the Journal for the 20th inst., seem to me to require explanation.

First is the question of the rubbish which you say was sent in to the gas companies last winter. I can only speak with certainty for the Holmside pits, and I can certify that the coals supplied were all fresh wrought. The gas coal trade, for a number of years past, although not admitting of high prices, has been sufficiently steady to prevent accumulation of coal at the pits. The rubbish could not therefore come from any of the best-known gas-coal collieries.

The second matter is one on which I agree with you—that there should be no whining over old contracts on the part of the coal-owners. Why should there be? If the contracts went against the coal-owners last year, they will be in favour of them this; and it seems to me that if gas companies make regular contracts at given times, a series of years is bound to strike a reasonably fair average between the two parties. I do not agree with your advice to gas companies, to buy only small quantities. Matters outside the influence of either gas companies or coal-owners largely fix the market value of coal; and if gas companies were to diverge from a safe mode of contracting for a twelvemonth's supply, for the sake of experimenting by the purchase of small quantities, they would often run imminent risks of failing to obtain the coals required. Such a policy would also probably have the effect of curtailing the general production of gas coal, and of raising prices by giving coal-owners a feeling of individual insecurity. A coal-owner having a large royalty will be inclined to sink capital and increase the output of his mines when he is dealing with companies that enter into yearly contracts; but he would hesitate if he were subject to changes every few months.

The only other point calling for remark is the 4d. or 6d. per ton which you speak of as going to the pitman, against the large rise in the price per ton of coal. This is explained by pointing out that what the pitman gets is on the whole of the coal worked, while the owner only gets his advance on the small proportion he has disposed of over and above his low contracts. Practically, the wages in Durham are still regulated by a sliding scale; and every three months the average price of coal is declared by professional accountants. The Durham miners have sharp and shrewd men always watching their interests; and they may be trusted to get their fair share of whatever is going.

It is within my knowledge that gas companies, both here and abroad, are holding back from contracting, and as in a month from now we shall have the days commencing to shorten, and as most of the collieries in Durham are already well contracted forward, it looks to me as if there would be again shortly the rush which always happens when people delay too long to face the inevitable.

Mark Archer,
Managing Owner of the Holmside Collieries.

Newcastle-upon-Tyne, May 22, 1890.

Sir,—I have just had a conversation with a colliery manager to-day, at the pit, and elicited some interesting figures respecting the advanced prices of coal. The colliery is a fair sample of those in the county of Durham—employing 270 hands, and turning out 450 tons of gas coals and house coals per day. The wages about a year ago were, to 90 hewers, an average of 4s. 6d. per day. A 30 per cent. increase has given them now 5s. 10d., or 1s. 4d. per day rise to 90 men, equal to £6. For 180 men and boys, the average was about 3s. 6d. Now they have 27½ per cent. more, or 11d. per day rise, to 180 hands, equal to £8 5s. The increased cost on the 450 tons of coal, at 7·6d. per ton, is therefore £14 5s. The coals a year ago were 6s. 6d. per ton at the coal-owner's depôt. Now they are 10s. 6d.—a rise of 4s. The miner gets 7·6d. Query: Where does the balance of 3s. 4·4d. go to? There are no long contracts; no increase in railway rates or royalties; nor other expenses. This is a moderate cost to some places, and your readers may judge whether or not your condemnation last week is correct.

Minus.

May 20, 1890.

The Dinsmore Process.

Sir,—In your issue of the 20th inst., I notice a reference to the Dinsmore process in a letter by Mr. L. A. Scott, Mem. Soc. Eng., in which he says: "The expense of adopting that process, and the alterations to plant involved, are at present against it, for small country gas-works at least." Allow me to state that the first and only cost of the conversion of an ordinary retort-setting into that suitable for the Dinsmore process is from £6 to £8 per mouthpiece. This cost is chiefly for ironwork, which will last as long as the hydraulic and foul mains exist, not having to be renewed every few years like the retorts. If this cost is extended over the length of time the material will last, the cost per annum will be very trifling. Again, on building a retort-bench under the Dinsmore process, and calculating the cost per make of each mouthpiece, it will be little more on a Dinsmore setting than on an ordinary setting. But what is the cost incurred compared with an increase of 30 per cent. in illuminating power and 10 per cent. in the volume of gas produced?

J. H. Fergusson,
Managing-Director, Dinsmore Gas Company, Limited.

Liverpool, May 23, 1890.

The Gas Workers' Union and the Stoking Machinery at Beckton.

Sir,—I am really surprised that a commercial paper such as the Journal is could commit such grievous errors. In your report you say the men at Beckton were only in receipt of 5s. 4d. per day working West's patent stoker. I am surprised, as one who has worked the machine for years at Manchester, how any man, not even excepting

Mr. John West, would try to mislead the public. Any man working at Beckton knows very well that the machine hands there have been in receipt of 5s. 9d. per day of eight hours since the 18th of November last; in proof of which I enclose an agreement between Mr. Beale, the Resident Engineer, and the workmen on Nov. 16, 1889. Not only that, but the machine hands had nothing whatever to do with augering pipes, &c.—men being told off for this class of work.

It is not my intention to say anything on the merits or demerits of the patent machine; but in justice to the men, I should like to disabuse the public mind of the error your paper would like to convey. You say a representative of yours went down to the works and made careful inquiry of the men. All the information he received was in the canteen from men who never would work while they could get four ale, and what he obtained from the interested parties—Mr. West, his son, and satellites.

W. H. WARD,
May 23, 1890. Assistant-Secretary, Gas Workers' Union.

[ENCLOSURE.]

Notice to Machine Men, No. 1 House.

Machines will go to work on Monday, Nov. 18, 1889; and the rate of pay will be 5s. 9d. per day for as many retorts as machines may be found to be capable of doing, with a reasonable amount of rest for the men.

Beckton, Nov. 16, 1889. FREDK. BEALE, Resident Engineer.

[Is it to be understood that 5s. 9d. is the established rate of wages for machine hands at Beckton? Is Mr. Beale's notice still operative? Or was the 5s. 9d. only paid for a short time; and if Mr. West can get the work done for 5s. 4d. now, will the Company pay more when the machines are taken over? There appears to be some misunderstanding here, which Mr. Beale, Mr. West, and Mr. Ward had better clear up between themselves before any one accuses the JOURNAL of publishing erroneous reports on this subject.—ED. J. G. L.]

Accidents from Oil-Lamps.

SIR,—Noticing in your issue for the 29th ult., a suggestion by Mr. Marks, Secretary of the Sheppy Gas Company, as to the benefit gas companies might receive from the distribution in their respective communities of leaflets containing compilations of press accounts of accidents from oil-lamps, I beg to send you, as a matter of possible interest to you in this connection, a copy of a pamphlet, of the character outlined by Mr. Marks, which has been published by this Company, and distributed throughout our city with good results.

IRVIN BUTTERWORTH, General Manager.
Columbus Gas Company, Ohio, May 10, 1890.

[The pamphlet referred to by our correspondent is entitled "Reasons why you should Light your Premises and Cook your Food with Gas instead of Oil." It consists of 64 pages, in a wrapper, and contains accounts of a large number of cases of injury to life and property caused by accidents with oil-lamps—the actual money loss (reaching a total of $1,700,000 last year) being given in many instances. The back page of the wrapper is devoted to the following statement, printed in prominent characters:—"The destruction of Chicago, the greatest calamity of the age, was occasioned by the upsetting of a coal-oil lamp."—ED. J. G. L.]

The Recent Labour Trouble at Bristol.

SIR,—My attention has been called to an article in the last number of the JOURNAL, headed "The Union Kicks." Your charge against the Directors of the Bristol Gas Company of making havoc with what was once a fine property, and the dismissal of an excellent Station Manager at the bidding of the Union leaders, they must answer for themselves. You say they actually debased themselves by receiving a deputation of their workmen behind this superior officer's back. The facts of the case are that we went before our Directors to complain of Mr. Lloyd discharging our fellow working men after faithfully serving them from thirteen to twenty years, without a stain upon their character, and still able-bodied men, and putting on inferior men in their places. If that is debasing for receiving us, then all honour to them for so doing. We say that Mr. Lloyd did not act right towards our fellow working men by so doing. As for the *ex parte* representations, what we said before the Directors we are prepared to prove. We believe in managers treating the employees as men, and not as dogs.

ONE OF THE DEPUTATION.
Bristol, May 24, 1890.

Portsmouth Water Company.—At the recent half-yearly meeting of this Company, the report presented by the Chairman (Lieut.-Col. E. Galt) showed that the revenue of the past six months had been £21,823, and the expenditure left £15,528 to be carried forward to the profit and loss account. The average daily supply of water by the Company was reported to be 4,846,000 gallons. The Chairman said he was pleased to inform the shareholders that all their structural works were in good order; and their springs were yielding as well as ever, not only pure water, but water of unsurpassable quality. The lime in the water was not hurtful in any way; and it was important that this should be the case, because he found that in Sheffield there had been no fewer than 1000 cases of lead-poisoning owing to the absence of chalk in the water. They had five large engines at work; and there was no reason to believe that the constant supply of water would be interfered with. The report was unanimously adopted. The meeting was then made special; and it was agreed to extend the time for completing the reservoirs at Portsdown Hill and the pumping-works at Bedhampton by an application to Parliament. The Chairman explained that the estimated cost of £8000 they had not thought it prudent to undertake at present, with their loss of revenue.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made last week, up to the Whitsuntide adjournment (May 22):—

Bill read the first time: Whitehaven Gas Bill.

Bills read a second time: Gas Orders Confirmation Bills (Nos. 1 and 2); Water Orders Confirmation Bills (Nos. 1 and 2); Gas and Water Orders Confirmation Bill.

Bills reported: Derby Corporation Bill; Plymouth Corporation Bill; Pontypool Gas and Water Bill.

Bills read the third time and passed: Belfast Corporation Bill; Stockton and Middlesbrough Water Bill.

Bills Royal Assented: Baildon Local Board Bill; Birkenhead Corporation Bill; Canterbury Gas and Water Bill; Derby Gas Bill; Gravesend and Milton Gas Bill; Hartlepool Gas and Water Bill; Leicester Corporation Water Bill; Luton Gas Bill; Thames Valley Drainage Bill.

HOUSE OF COMMONS.

Monday, May 19.

THE LONDON WATER COMPANIES AND THEIR CHARGES.

Mr. J. ROWLANDS presented a petition from the Vestry of the parish of St. Luke's, praying the House to take into consideration the whole subject of the water supply of the Metropolis, and protesting against the present system of taking the rateable value of the premises supplied as the basis of payment, as being most unfair to consumers. He moved that the petition be read by the Clerk at the table.

This was agreed to; and the petition was read accordingly.

Mr. J. KELLY asked the President of the Local Government Board, if, in view of the quinquennial reassessment of property in London, which would come into force in 1891, and would give the Water Companies power to exact an increased charge for their supplies, he could give the House any assurance that he would introduce a Bill during the present session for the purpose of suspending the powers of the Companies to increase their charges for water consequent upon such increase in the assessment, and so prevent them from being in a position to force up the prices at which their undertakings would have to be purchased eventually by the London County Council.

Mr. RITCHIE: The powers to which my honourable friend refers are powers conferred by statute on the Water Companies, and cannot, I think, be dealt with alone. The matter is one which should be considered in connection with the whole question of water supply. I need hardly say we can hold out no hope of dealing with so difficult a question during the present session.

LIGHTHOUSE ILLUMINANTS.

Mr. T. W. RUSSELL asked if the Committee consisting of certain members of the Royal Society, appointed some time ago to inquire into the question of lighthouse illuminants, had yet reported.

Sir M. HICKS-BEACH: There has been some unavoidable delay in this matter, in consequence of a change that it was found necessary to make in the composition of the Committee; but I have communicated with the President of the Royal Society, and I understand the report of the Committee may be expected in the course of the summer.

Wednesday, May 21.

LOCAL GOVERNMENT PROVISIONAL ORDER (GAS) BILL.

A Bill to confirm a Provisional Order of the Local Government Board under the provisions of the Gas and Water Works Facilities Act, 1870, and the Public Health Act, 1875, relating to the Local Government District of Burley-in-Wharfedale, was presented, read the first time, and referred to the Examiners.

Friday, May 23.

[ELECTRIC LIGHTING PROVISIONAL ORDERS BILLS.

Sir M. HICKS-BEACH presented nine Bills to confirm Electric Lighting Provisional Orders relating to the following places:—

No. 1.—Cambridge, Dover, Hove, Walsall, Wolverhampton, and Worcester.

No. 2.—Burnley, Bury (Lancs.), Chester, Fleetwood, Lancaster, and Salford.

No. 3.—Bacup, Bedford, Crompton, Huddersfield, Malvern, Oldham, and Stockton-on-Tees.

No. 4.—Accrington, Barnsley, Blackpool, Burton-on-Trent, Cheltenham, and Darlington.

No. 5.—Bournemouth, Derby, Hastings and St. Leonards, Oxford, Portsmouth, and Woking.

No. 6.—Birkenhead, Great Yarmouth, Kingston-upon-Hull, Nottingham, Wigan, and York.

No. 7.—Belfast, Blackburn, Leicester, Morecambe, Sevenoaks, and Tunstall.

No. 8.—Ayr, Bognor, Eastbourne, Galway, Stafford, and Tiverton.

No. 9.—Lambeth, North London; St. James's, Westminster, St. George-the-Martyr, Southwark, and part of Camberwell, and Wandsworth District.

The following progress was made last week, up to the Whitsuntide adjournment (May 23):—

Bills read the first time: Belfast Corporation Bill; Dewsbury and Heckmondwike Water Bill; South Lincolnshire Fen Water Bill; Stockton and Middlesbrough Water Bill.

Bills read a second time:—Mid-Sussex Water Bill; Portsmouth Water-Works Bill; Sutton, Southcoates, and Drypool Gas (Electric Lighting) Bill.

Bills reported: Glasgow Corporation Bill; Huddersfield Corporation Water Bill; Partick, Hillhead, and Maryhill Gas Bill (preamble not proved).

Bills read the third time and passed: Leicester Corporation Water Bill; Whitehaven Gas Bill.

Petitions against the following Bills were presented:—Airdrie and Coatbridge Water Bill, from the County Councils of Linlithgow and Lanark; Mid-Sussex Water Bill, from Owners of land and other property in the parish of Worth.

The following members have been added to the Select Committee on the Metropolis Management and Building Acts (Amendment) Bill:—Baron Dimsdale, Sir Lyon Playfair, and Mr. Tatton Egerton.

HOUSE OF COMMONS COMMITTEE.

Friday, May 16.

(*Before Mr.* THEODORE FRY, *Chairman; Viscount* BARING, *Mr.* AIRD, *Mr.* BALLANTINE, *and Mr.* BONHAM-CARTER, *Referee.*)

PARTICK, HILLHEAD, AND MARYHILL GAS BILL.

This Bill—which, as originally deposited, was to dissolve the Partick, Hillhead, and Maryhill Gas Company, Limited, and to re-incorporate it with all the original, and some additional powers, particularly with regard to electric lighting—came to-day before a Select Committee, constituted as above. The scope of the measure had been much restricted by the withdrawal of the clauses relating to electric lighting; and consequently the points which the Committee had to consider bore principally on the opposition offered to the proposed re-incorporation of the Company under parliamentary authority—their operations being carried on in a district in respect of which statutory powers in regard to the supply of gas had already been granted to the Glasgow Corporation.

Mr. LITTLER, Q.C., Mr. F. MOULTON, Q.C., and Mr. READER HARRIS appeared for the promoters; Mr. POPE, Q.C., Mr. BALFOUR BROWNE, Q.C., Mr. CRIPPS, Q.C., and Mr. WORSLEY-TAYLOR represented the Corporation of Glasgow; and Mr. LEWIS COWARD, the Kelvinside Electricity Company and the Trustees of the Kelvinside Estate Company, who opposed the Bill.

Mr. LITTLER, in opening the case for the promoters, explained that the object of the Bill was to convert the present limited Company into an incorporated Company with parliamentary powers. He entered at some length into the history and progress of the Company, and its relations with the Local Authorities of the districts it served, as well as with the Corporation of Glasgow. He said the Company was formed with the approval and support of the three Local Authorities concerned, who agreed that the projectors should have the power of opening streets and other matters, and promised to support it in every way in their power. The Company had to fight their way with the Corporation of Glasgow; but they had supplied gas in their district to the satisfaction of the consumers, who had not made any complaint either as to quality, pressure, or price. So successful had been the management, and so satisfied were the Local Authorities, that at the present time the Corporation of Glasgow only supplied 20 per cent. of the gas used in the district; 80 per cent. being supplied by the Company. The consumption of gas sent out by the Company had risen till it was now 300 million cubic feet per annum; and this was now the largest private gas undertaking in Scotland. It was therefore in a position in which it was unjust to itself and its customers that it should be without parliamentary privileges. It was obviously too large to work without incorporation. It was supported by the Local Authorities by whom it had been fostered, and was practically only opposed by the Glasgow Corporation. The Corporation had over and over again, since its defeat in 1870, endeavoured to obtain possession of the Company's area for municipal as well as gas purposes; and no later than the present session they promoted a gigantic scheme including the district in the city boundaries. This of itself rendered it necessary that the Directors of the Company should consider the position in which they were, because obviously if the district became part of Glasgow, they would be under the control of a new municipal authority, which would stop their opening streets, and thus place them in a very serious position. They were the competitors of the Glasgow Corporation as suppliers of gas, and they would then have been in the position of having the Corporation exercising power over them as the road authority. There would have been little chance for the Company if this had taken place. This was one reason for the Company's coming to Parliament this year; another was their desire and the necessity to have the ordinary corporate powers. They proposed a reasonable amount of capital in the sum of £200,000, of which £188,000 was already in existence. To show the Committee how the Glasgow Corporation could indirectly do mischief to those outside their area, the learned Counsel mentioned that they were charging inside the city a water-rate of 7d., and outside one of 11d. The district of Old Kilpatrick had now amalgamated with the Company; and the result of the passing of the Bill would be that there would be an immediate reduction in the price of gas in that district of from 5s. to 3s. per 1000 cubic feet. The Corporation of Glasgow petitioned against the Bill on the ground of competition; but the Company were perfectly willing to buy the portion of the Corporation gas property lying within their territory. If the Corporation thought fit to ask the Company to purchase their rights, they were perfectly prepared to do so—that was to say, they would buy not merely the pipes, but they would buy the property as part of a going concern. What the Company asked was to be in a position to be able to protect themselves. They did not wish to protect themselves against their own local authorities, but against an adjacent authority which was always reading, but not taking to heart, the story of Naboth's Vineyard.

The following evidence was then given in support of the Bill.

Mr. *J. Muirhead*, of the firm of Messrs. Muirhead and Smith, Solicitors of the Company, stated that the proposal of the Bill was to make the limited an incorporated Company, and to alter the Memorandum of Association so as to enable the Company to apply to the Board of Trade for a Provisional Order for the supply of electricity. Neither of these objects, in his opinion, could concern the Corporation of Glasgow. Since 1875, the Company had reduced the price of gas from 5s. to 2s. 6d. per 1000 cubic feet, and they were able to hold their own with the Corporation and give satisfaction to the consumers. Last year they paid a dividend of 6 per cent., and carried over 4 per cent. to a reserve fund; and this was after paying the interest on all the preference stock.

In cross-examination by Mr. POPE, witness said that if the Company obtained their Act they would only be in the position in which they had been in for the last 20 years; but they promoted the Bill in order to have the ordinary statutory protection. They wanted to have the right to lay down and repair pipes without interference. No doubt, if the statutory powers now asked were granted, the position of the Company would be enhanced, and their concern would be increased in value—a statutory undertaking being regarded as of more value than a private or a limited one.

In reply to Mr. COWARD, witness said that he was aware that an Electrical Supply Company had been formed in Kelvinside, and that they were applying for a Provisional Order for the supply of electricity within the district. The Company he represented was a local concern, and they thought they could serve the area. They supplied gas to most of the Kelvinside district.

Mr. *J. Wilson*, M.P. for Govan, said he was a shareholder in the Gas Company, which he believed was originally formed on account of the dissatisfaction entertained about the differential rate imposed by Glasgow in 1871. To places outside the city boundary they charged an extra 2½d. per 1000 cubic feet; and they had the power to charge as high as 6d. So far as he knew, the supply of gas had been thoroughly satisfactory in all the districts. If it had not been so, the residents would have gone to the Corporation. Apart from the districts of the Company, he believed that outlying burghs had benefited from the competition between the Company and the Corporation, for their existence had tended to reduce and level rates all round. In his opinion, the Company had every claim to statutory powers; and if they were granted he had no doubt they would be able to raise their capital at more favourable rates. On the question of surrendering, he thought if the Corporation consulted their interest they would take the Company out of the way; for as long as they were in existence, they would always be a competitor.

In cross-examination, witness said he believed the Company were before Parliament in 1883 with an application similar to the present one, and the House of Commons refused to grant it.

Tuesday, May 20.

Mr. *James M'Gilchrist* said he was Chairman of the Dalmuir Gas Company, which supplied the district of West Kilpatrick; and was at present Engineer and Manager of the Dumbarton Corporation Gas-Works, having been formerly in the service of the Partick Company, which he left in 1874. The Dalmuir Company had been established about 30 years, and was the only means of gas supply for the district up to eight years ago, when the Glasgow Corporation laid on a service to Clydebank. The Dalmuir Company had been in treaty with the Partick Company for the sale of their works; and the negotiations had now resulted in the latter Company making the purchase. The Dalmuir Company had powers of supply over West Kilpatrick, but they had not exercised them. The feeling of the inhabitants of the district was in favour of the Company and against the Glasgow Corporation; and it was produced by the differential rates.

In cross-examination by Mr. CRIPPS, witness confessed that if a company without statutory powers applied for such powers in order to supply his district, he should be inclined to oppose them. If there had been no differential rates, he did not believe there would have been any Partick Gas Company. The bargain between the Dalmuir and Partick Companies was completed the previous week; the price being £11,000.

In re-examination, witness said the negotiations were commenced a long time ago, but were interrupted by the Glasgow boundaries extension scheme; and it was only after the withdrawal of that scheme that the purchase was completed.

Mr. *D. Swan* said he was well acquainted with the burgh of Maryhill, having been a Police Commissioner and Provost of the burgh for 16 years. In 1845, in consequence of the refusal of the Gas Company in Glasgow to supply the district with gas, they started works of their own; nearly the whole of the capital being subscribed within the burgh itself.

In cross-examination by Mr. CRIPPS, witness said he regarded the Bill before the Committee as a burgh scheme. He was in favour both of the present Company obtaining statutory powers and the Glasgow Corporation being continued as a source of supply.

In answer to the CHAIRMAN, witness said he thought a fair price might be agreed upon for the purchase of the works by the Corporation; and he still considered it would be better to have competition.

Mr. *A. S. Baird*, Provost of Hillhead, gave evidence in favour of the Bill; remarking that the imposition of a differential rate by Glasgow had created a feeling of indignation in the district, and caused great sympathy for the Partick Company.

Mr. *A. H. M'Lean*, residing in Kelvinside, and Sir *Andrew M'Lean*, Provost of the burgh of Partick, gave similar evidence in regard to their particular districts.

Mr. *H. H. Begg*, a resident in the Kelvinside district, and a shareholder of the Partick Company, stated that in 1888 the Directors of the Company received an offer from the Corporation of Glasgow to purchase, for £122,370, what had cost the Company £129,300. On Nov. 27, 1888, the Directors called a meeting of the Company, when the Chairman moved a resolution accepting the offer of the Corporation. But it was lost; and ultimately it was decided that the matter should be referred to two practical experts, with power to call in a third party in the event of disagreement. So far as he was aware, no other offer had been made by the Corporation. As a shareholder, he should like the Corporation to purchase the undertaking.

In answer to the CHAIRMAN, witness said that the offer of the Corporation was about twelve years' purchase; and he believed their opposition to the Company was with the view of making them sell at a lower price. He believed that even at that stage an amicable arrangement might be come to as to price.

Mr. LITTLER said the Company were prepared either to buy the

Corporation works in their district, or to sell their own undertaking to the Corporation—that was, provided the authorities would be content with either course.

The CHAIRMAN: It appears from all the witnesses that one authority should have the supply of gas.

Mr. LITTLER said that, as he understood it, the Local Authorities would prefer the Company to the Corporation; but the Company were prepared to deal with Glasgow upon fair and open terms.

The CHAIRMAN: Does the Glasgow Corporation entirely reject the arbitration clause?

Mr. BALFOUR BROWNE: Certainly. We are here entirely opposing their Bill.

Mr. *J. Grahame*, Chartered Accountant, said in his opinion the offer made by the Corporation was not a fair one; and if they would not now buy, he saw no reason why the Company should not have statutory powers.

Mr. LITTLER said that, as nothing was really disputed, he would not call professional evidence, but would put in the Rochdale and other Acts of Parliament, which were precedents in his favour—these Acts being passed under circumstances similar to those of the Partick Company.

The Acts having been put in, the room was cleared for the Committee to consider the course they would pursue. Upon the public being re-admitted,

The CHAIRMAN said the Committee had decided to hear evidence against the Bill.

Mr. *W. Foulis*, General Manager of the Glasgow Corporation Gas-Works was then called, and examined by Mr. BALFOUR BROWNE. In the course of his evidence, he said the differential rate that was charged in the Partick Company's district was 2¾d. more than that paid in Glasgow. This rate, however, was removed in June, 1871, prior to the Company having expended a single penny upon their works—the Partick works not being commenced until November, 1871. If the Company obtained statutory powers, they would be under the same restrictions as the Glasgow Corporation; and there would be nothing to prevent another company or several other companies starting and competing for the supply of gas. The price offered to the Company by the Corporation for their undertaking he considered to be an ample one, and quite as much as it was worth.

In cross-examination by Mr. MOULTON, witness admitted that the Company supplied in their district five or six times as much gas as the Corporation; but he contended that statutory powers should not be given to them, for the reason that Glasgow had already paid a large sum for the district to the two Companies whose works were bought up. He believed that if the statutory powers asked for were not given, the Corporation could compete with the Company. It was going too far to say the Corporation would be able to crush them out of existence; but he thought the Corporation would be able to compete with the Company in such a way as to prevent them paying any dividend to the ordinary shareholders.

By the CHAIRMAN: If the Bill were passed, it would enhance the value of the Company's works; if thrown out, he did not believe it would depreciate their value if sold to the Corporation. The Corporation did not care to buy now, as other companies might spring up.

The CHAIRMAN said he thought it a pity that the two bodies could not come together and fix a price.

Mr. *G. Livesey*, who was the next witness, said he knew of no precedent since 1860 for the passing of such a Bill as the one before the Committee. If it were thrown out, the Company would be in exactly the same position as at present; and if passed, the value of their works would be enhanced.

Mr. *Charles Hunt* gave similar evidence; but, in cross-examination, said he did not believe the granting of statutory powers would increase the value of the undertaking in this particular instance. He thought it would merely enable the Company to "ask for more;" but they would not get it. He added, in answer to the Chairman, that he did not think it would be advantageous for the Corporation to purchase the Company's undertaking.

At this stage of the proceedings the room was again cleared. Upon the re-admittance of the public,

The CHAIRMAN said the Committee thought it would perhaps save time if they stated at once that, after giving the best consideration they could to the matter, they had come to the conclusion that the preamble of the Bill was not proved.

The Committee then adjourned till the following morning, when it was arranged that Mr. Littler (who was not present when the Committee's decision was given) should be heard in reply.

Wednesday, May 21.

On the re-assembling of the Committee this morning,

The CHAIRMAN, addressing Mr. Littler, said that on the previous day he made an announcement in the absence of the learned gentleman; and it was only right that he should now follow it up by stating that the Committee were prepared to hear evidence as to precedent; after which Mr. Littler would be allowed to reply, and Mr. Pope would also be permitted to make a few remarks.

Mr. LITTLER said he proposed to do something more than that. He desired to call expert evidence.

Mr. BONHAM-CARTER said the decision of the Committee was that no further evidence should be heard from the petitioners, except perhaps one witness with regard to precedent. Under these circumstances, it was for Mr. Littler to say whether or not he wished to exercise his right of reply.

Mr. LITTLER said he should certainly exercise it, and he still asked to be allowed to call expert evidence.

Mr. POPE said the course proposed was out of order, as his learned friend had closed his case.

The CHAIRMAN said that was certainly the understanding of the Committee.

Mr. LITTLER said it was a little unfortunate that he should be placed in this situation, because no intimation was made that the Corporation intended to call expert evidence. He must say he thought it was a most unfair way of conducting a case. However, it now became his duty to address the Committee in reply; and at the outset he would repeat that there had not been a tittle of evidence given why the Bill should not pass. Even if the Committee passed it, they were prepared to go to arbitration with the Corporation for the purchase of the undertaking. The real question for the Committee to consider was whether or not it was right that they should endorse the conclusion come to in 1872, when a Bill similar to this, by the same Company, passed the House of Commons. He submitted that there was no possible reason why the Company should be placed in a different position to other companies supplying gas. The only opposition came from a competing undertaking that could not do so well as the Partick Company; and therefore a vast injustice and the greatest wrong would be done to the Company if the Bill were not passed. Notwithstanding all that had transpired, he asked the Committee not to sacrifice £170,000 of capital, which had been invested in good faith, to resist the greed of the Corporation of Glasgow. If the Bill were passed, the Company would not object to a provision being inserted that they should not, as a consequence, enhance their price—that the works should be sold at arbitration price.

Mr. POPE remarked that he had no desire to say anything.

The room was then cleared. Upon the re-admittance of the public,

The CHAIRMAN said the preamble of the Bill was not proved to the satisfaction of the Committee.

Malta and Mediterranean Gas Company, Limited.—The accounts of this Company for the year ended March 31 last, show that there has been an improvement in the revenue from all sources. The receipts amount to £30,353; and after paying all working expenses, there remains a balance to be carried to the general revenue account of £11,435. After providing for the dividends on the first and second preference capital, the Directors recommend that a dividend of 4 per cent. be declared on the ordinary capital of the Company; making, with the interim payment in December last, a total dividend of 6 per cent. for the year, leaving £1172 to be carried forward. The Directors report that a new tank and gasholder have been satisfactorily constructed at Malta; and they form a valuable addition to the Company's works. They also announce, with deep regret, the death, on June 24 last, of their valued colleague, Mr. Arthur Clarke. In accordance with the provisions of the Articles of Association, Mr. J. Orwell Phillips has been elected to the vacancy.

The Quality of the Stockport Water Supply.—The publication of the result of the analysis by Messrs. Grace-Calvert and Thomson of the water supplied by the Stockport Water Company to Cheadle, referred to last week, has caused some commotion in the district. According to a statement made to a representative of a local paper by the Secretary of the Company (Mr. Mather), the water analyzed was taken from the flushing hydrants, and consequently ought not to be regarded as a fair sample of the supply to dwelling-houses. The Company were sending out 700,000 or 800,000 gallons of water daily for domestic consumption, and not a complaint had been heard except from Cheadle. So satisfied were the Company that their water was pure and wholesome, that they intended to have samples for analysis taken on their own account from the taps in the dwelling-houses. The Medical Officer of Health for Stockport (Dr. E. Rayner, J.P.) states that the last time he analyzed the water he found it satisfactory. With regard to obtaining samples from the flushing hydrants, he confirmed the view expressed by Mr. Mather—that it afforded no real test of the pipe supply to the dwelling-houses, and was, consequently, unfair. He expressed the opinion that there was no cause for alarm or anxiety.

Improvements at the Salford Gas-Works.—A special meeting of the Salford Town Council was held last Friday, for the purpose of considering the following resolution of the General Gas Committee:—"That, subject to the approval of the Council, the tender of Messrs. Clayton, Son, and Johnson, for retort ironwork, in accordance with plans and specification, for the sum of £6900, be accepted, and that the Town Clerk prepare the contract." The Mayor (Mr. B. Robinson) said the meeting had been called because the Gas Committee had a certain amount of work to get through before the winter months set in; and they wished to go forward with it without delay. Mr. H. Lord, Chairman of the Gas Committee, moved the adoption of the Gas Committee's recommendation; observing that the tender was the lowest of six that had been received. The motion was seconded by Mr. Holland, the Deputy-Chairman of the Committee. Mr. Phillips, speaking in support of the resolution, said the productive capacity of the works at the present time was not much ahead of the demand; and it was important that no time should be lost in preparing for the increase in the consumption that always took place during the winter season. The motion was adopted.

Buenos Ayres (New) Gas Company, Limited.—In the statement which the Directors of this Company have prepared for submission to the shareholders at their meeting next Friday, they state that the increase in the quantity of gas consumed in 1889, compared with 1888, is 19·38 per cent. The private consumption of gas again shows an increase of 15·04 per cent., and the gross income, 37·21 per cent. over the previous year. In November the price of gas to private consumers was raised 25 per cent. In consequence of the depreciation in value of the paper currency in the Argentine Republic, £74,841 was lost during the year on remittances and payments made in Buenos Ayres in sterling. In addition, £30,000 has been set aside from the profits and carried to suspense account, to meet the estimated loss on unremitted balances on Dec. 31. This severe drain on the Company's profits, together with the inability of the Municipality to meet its financial engagements with punctuality, has been a source of anxiety to the Directors; but notwithstanding these disadvantages, the shareholders may be satisfied to find that the balance of revenue remaining to be dealt with (after making provision for these sums and the fixed charges) amounts to £43,646. From this it is proposed to carry £5000 to the reserve fund; thereby increasing it to £84,243—leaving for distribution the sum of £25,825. The Directors recommend that the dividend for the year be at the rate of 8 per cent. (free of income-tax), 3 per cent. of which has already been paid. This will leave a balance of £3094 to be carried forward.

LEGAL INTELLIGENCE.

CHANCERY COURT OF LANCASHIRE.—Monday, May 19.

(*Before Vice-Chancellor* BRISTOWE.)

Haworth v. The Corporation of Salford—The "Hunter Compact."

The action of Mr. George C. Haworth against the Corporation of Salford, which had for its object to restrain the Corporation from sealing the release proposed to be given to Hunter and the contractors implicated in the gas frauds (as briefly reported last week) came before the Court to-day, in the form of a motion for an interim injunction.

Mr. ROTCH and Mr. WOODBURNE appeared for the plaintiff; Mr. WARMINGTON, Q.C., and Dr. PANKHURST, for the Corporation.

Mr. ROTCH, in opening the plaintiff's case, said his Honour would recollect that when the matter was first before the Court at Liverpool the previous week, he granted an *ex parte* application for an injunction extending over the next day, with leave to serve notice of motion for the next day, to restrain the Corporation from carrying out an agreement with their late Gas Engineer, Samuel Hunter, who was now in gaol serving a term of five years' penal servitude. Dr. Pankhurst appeared the following morning for the Corporation and the question was discussed at considerable length, and finally, after declining, the Corporation agreed to give an undertaking, and the motion for an injunction was allowed to stand over till now. The plaintiff took till Friday to put in his evidence in reply to the statements of the defendant Corporation, and the Corporation Solicitor —the Town Clerk—had been cross-examined on his affidavit. At present it would not be necessary to go into the matter at the great length at which it would have to be gone into at the trial of the action, because all he had to do was to satisfy his Honour that this was a question of great importance to the trial of the action, and to convince the Court, as he thought he would be able to do, that it was desirable that matters should be kept in *statu quo*, so as to prevent any change in the circumstances between now and the date of the trial of the action. If he so convinced his Honour of the seriousness of the question, he would ask that, in view of the balance of convenience, the Court should grant an interim injunction restraining the Corporation from carrying out the release of Hunter and the contractors, or that the Corporation should give an undertaking not to disturb the *status quo*. The agreement that had been entered into, they contended was not only *ultra vires*, but it was illegal. The eighth clause of the agreement was that, upon payment of any sum by the contractors, Hunter should be entitled to receive and have returned to him a corresponding portion of the security; and upon being satisfied that any contractor had paid a sum satisfactory to Hunter, the Corporation should give the contractor a complete and sufficient release for all claims in connection with the matter. That sum, whatever it was, had to be taken in full discharge of all claims against Hunter. By the Corporation putting themselves in the rather undignified position of collectors, they had obtained in all some £7000 odd; and this had been applied against the £10,000, and Hunter had paid the balance in. Hunter was therefore entitled to say to them then that he had paid the money in, and to ask for his securities to be released. He could also say that he was entitled to call upon them to give a release to any contractor who had paid such a sum as he considered satisfactory. In addition to that, Hunter could ask them to give a release from all claims against him. The fact that he was entitled to ask that the contractors should be released from all claims when they had paid such a sum as he considered satisfactory was what made it important, from the plaintiff's point of view, that this discharge should not be given, because it might bring in twenty other persons who might say that they had a release under the seal of the Corporation, and who would have to be brought in as defendants in this action to test whether or not the release was valid. Therefore, on the ground of convenience, everything was in favour of continuing matters *in statu quo*.

The VICE-CHANCELLOR said it would be agreed that, on a motion like the present, he could not direct that the agreement was fraudulent and void, or *ultra vires*, because it had not yet been executed; but that he might restrain the execution of the deed till the hearing later on.

Mr. ROTCH (continuing) said that several of the cases had been settled; and the *modus operandi* was this: The money was paid into the bank; and the bank informed the Corporation the money was paid in. Thereupon, at the request of Hunter's Solicitors, the Corporation by consent discontinue the action; and this without knowing the terms. The Town Clerk said that though sums of money had been paid into the bank under this agreement, he himself did not know and could not tell them which of these actions had been settled by the Corporation, and for how much money. The Town Clerk did not know if the action against the Gas Meter Company, for instance, was settled for £500 or for £1000. The bargain was that Hunter was to be the sole judge as to whether or not the sum paid was adequate. One instance he would give. An action was pending against Messrs. R. Dempster and Sons, and £3500 was claimed. Messrs. Bowden and Walker were the Solicitors for Messrs. Dempster and for Hunter; and Hunter's Solicitors, acting for Dempsters, settled the action for £700. That was too ludicrous. Another case was that of Mr. Emor G. Wrigley, against whom the Corporation made a claim of £17,000; and this action was settled for £250. But the Town Clerk did not know that. Another claim made by the Corporation was that against Hurst for £11,673; and this had been settled for £200. Counsel briefly referred to the conviction of Hunter and the sentence of penal servitude passed upon him, and to the various other events preceding the appointment of the Consultative Committee, on whose recommendation, the Corporation said, the agreement with Hunter now under discussion was entered into. But the Committee, he averred, never saw the agreement until it became common property. It was calculated that the whole of the claims against the contractors amounted to £55,000; and they had been settled apparently for £7711.

Mr. WARMINGTON: You might just as well say that the claims came to £105,000.

Mr. ROTCH said that this left Hunter to pay £2289, and apparently he did on May 13 pay this money. Hunter, the greatest sinner of the lot, therefore escaped by this agreement for £2289; and these enormous claims, amounting to £55,000—all of which they might, of course, not have obtained, but still they might have secured a substantial sum —had been settled for £7711. This was bad enough; but there was one little thing of which he must remind his Honour. The agreement made in August contemplated other actions being brought against bribing contractors. After that date an action was brought against Mr. Ellis Lever, and that was tried. The claim in that action was for £2329. Fortunately that was tried out. Probably Hunter owed Lever a grudge, because Lever was the original cause of his imprisonment; and therefore he held his hand, and that action was allowed to be tried. This £2329 was distinctly part of the £10,000. It did not suit the view of the Corporation to treat it as such now; but he could not see how it could be said to be outside the agreement. If he was right that it was within the purview of the agreement, the Corporation had £40 too much—leaving out the £2289, because that might have been paid by Hunter by mistake. What was to become of the £40? The Corporation were not to keep it; they were only to have £10,000. Surely the £40 would have to be handed back to Hunter. Mr. Rotch then read the plaintiff's affidavit in the present action. The affidavit contained a reference to the statement of the Master of the Rolls that the agreement was *ultra vires*. The Master of the Rolls, in making that statement, was under a mistaken impression as to the facts, and thought that money received by the Corporation was to be handed over to Hunter.

The VICE-CHANCELLOR said anything over £10,000 received would have to be paid to Hunter.

Dr. PANKHURST said the agreement was silent as to that.

The VICE-CHANCELLOR: And silence is consent.

Dr. PANKHURST contended that it was not, and that any such money in excess would go to the benefit of the ratepayers.

The VICE-CHANCELLOR: The agreement reads: "It being understood that the Corporation is to receive a clear sum of £10,000." I do not see the error of the Master of the Rolls.

Dr. PANKHURST said the Master of the Rolls had fallen into a natural error as to the facts; the agreement not being before him. It was clear his impression was that the £10,000 was to be paid by the Corporation to Hunter, and that he said was *ultra vires*.

The VICE-CHANCELLOR: It is attributed to him that he was under an erroneous impression. As far as that impression is conveyed by the statements in the affidavit, it appears to me that it was a perfectly right impression.

Mr. ROTCH (proceeding) submitted that the Corporation had no power at all to sell its right of action to recover sums of money from fraudulent contractors. This was not a case of property bearing with it a right of action, but a mere naked right to recover damages against persons who had bribed a servant of the Corporation. His final ground was that the agreement was void on the ground of maintenance and champerty.

Mr. WOODBURNE then addressed the Court. He said he would contend that the agreement was bad from champerty and maintenance. It had been held by the authorities that maintenance was the intermeddling of any person with another man's suit in which he had no interest. Hunter could not be said to have any interest in the actions which the Corporation had brought. He had no right of action himself against any of the contractors; and if it was suggested on the other side that he had an interest, inasmuch as he would get the proceeds, or an equivalent for the proceeds, he replied to that that maintenance could not be justified by pleading champerty, because champerty was that sort of maintenance which consisted of dividing the spoil. If the Court would not go so far as to say the contract was bad from maintenance and champerty, it might be of opinion that it was so tainted with it that any proceedings in relation to the contract could not be sanctioned, and must be declared void.

Mr. WARMINGTON said he had to submit that the agreement was a good one. Even if the criticisms of his learned friend were correct, nothing of an obnoxious character had been done under the agreement; and there was nothing to be done now. All that was required was that a certain release should be executed. Now what was the position in which the Corporation were placed when they entered into this agreement? They had brought actions against Mr. Hunter and against certain contractors; but they were advised that if these actions went on, there would be a prolonged litigation and doubtful success. Why? Because there was locked up in Hunter's breast the information which was essential for the Corporation's success. Unless his friend could bring an authority on this, he would have thought it was absolutely clear law that any corporation or any body of persons could compromise an action begun or threatened against any persons upon whom they had a claim. The terms of the compromise were quite clear. He could not understand the term maintenance as it had been used by his learned friend. The Corporation and Hunter had a joint interest in the recovery of these moneys. The sum of £10,000 very likely did not represent the whole amount; but surely that was a question for the Corporation to settle for themselves. But for the agreement the Corporation could not have obtained what they had done. Proceeding to refer to the terms of the agreement, the learned Counsel said that so far as the costs were concerned in successful actions they did not come out of the £10,000; but they came as a first charge out of what was received from the contractors. Apart from settlement, any money that was paid by the contractors must go to the ease and relief of Hunter. It could not be helped, and nothing but an Act of Parliament could prevent it. The whole thing was to have been completed on Dec. 31 last. On that date the Corporation were entitled to draw a line, and say they would stay their hands altogether, and would take their £10,000. Where was the transfer of the right of action then? He was bound to say that he could not see any transfer of this right. The Corporation had received their £10,000, and surely they ought then to give a full and complete discharge to the contractors. That was what was intended; and everybody admitted that that was a right and proper thing to do.

The VICE-CHANCELLOR: Supposing Hunter says a contractor has not paid a sum which is satisfactory to him, then you would not give a

release to that contractor. Then you could sue the contractor. What becomes of the sum which you would recover from that contractor?

Mr. WARMINGTON: Of course we keep it.

The VICE-CHANCELLOR: Not beyond the £10,000?

Mr. WARMINGTON: Certainly.

The VICE-CHANCELLOR: No; because you are only to have the £10,000, and no more.

Mr. WARMINGTON: From Hunter. There is no transfer of our right of action against the other contractors.

The VICE-CHANCELLOR said the agreement seemed to show that the Corporation were to receive a clear sum of £10,000, and no more. That was the utmost they could receive; and it did not matter whether it was from Hunter or from the contractors.

Mr. WARMINGTON urged that there was nothing that limited their rights against contractors in this case. The agreement was entirely silent as to actions that were not settled; and as to the actions that were settled, the amount received in settlement went to the credit of the £10,000. There was nothing in the agreement which showed that with regard to any contractor who had not been settled with, the Corporation's right of action against him was transferred to anybody. Hunter had no rights under the agreement after the £10,000 had been paid, because the agreement was then at an end. He submitted that the agreement was perfectly clear. An attempt was being made to obtain a declaration that the agreement was in itself illegal. With regard to that, he submitted that if the parties had so wished there were proper ways of commencing that litigation, and the proper mode was not to accept all the benefit, and then not accept the obligation which was the price of the benefit. If his friends on the other side had come into Court, and had offered to guarantee the Corporation £10,000, he could have understood it; but for these gentlemen to bring an action of this kind, when the Corporation had received the full benefit of the agreement, and they simply came in at the end and said they wished to prevent the Corporation from executing the release, he was bound to say that in the whole course of his practice he never heard of such an application. He questioned whether the plaintiff had *locus standi*.

Dr. PANKHURST also submitted that the Corporation had right and power to compromise the subject-matter of these actions; and they had compromised them by the agreement.

The VICE-CHANCELLOR, in giving judgment, said his view was quite clear. At the outset, it was desirable he should state that in his opinion, after carefully considering the evidence, there was no case of *mala fides*. The intention of the Corporation, acting through a Sub-Committee, which again, although perhaps not in a very formal way, reported to the Council the result of its deliberations, was that, having regard to the difficulties of prosecuting a litigation in which they were involved by reason of the apparent frauds of Hunter, it was desirable to come to some definite conclusion, to stay expensive litigation and to clear up the matter between the Corporation and Hunter and the contractors, and that it was agreed by those who were delegated for that purpose to accept a compromise on such reasonable terms as they might think fair and proper. It should be also stated that in his view this compromise must necessarily be in itself of a legal character—he meant that it must not be a compromise that would be absolutely wrong and illegal, and on the face of it bad, but such a compromise as private individuals who did not happen to be a corporate body would have considered a desirable compromise to come to. That was the basis on which they must approach the question. Now the point was raised by Mr. Rotch and Mr. Woodburne that under the circumstances the balance of convenience was such that he ought to grant an injunction to restrain the Corporation from executing the release until the trial of the action. He did not think that was a correct view to take, because it appeared to him that the whole of this transaction from the commencement was sufficiently known to all parties, although he would not say in all its details. It was known that a compromise was going forward, and that the general nature of it could without any difficulty be ascertained, and whether there was anything wrong or improper about it. Therefore, unless there was some very strong case made out for an interim injunction, he ought not to interfere, but to leave matters to go on, so that the deed would be executed and the compromise completed; and if there was anything wrong in the deed or in the compromise, the plaintiff might at a later period succeed in upsetting the deed, the compromise, and everything. That would be a matter for the trial. What was the effect of executing the release? As far as he was able to understand, upon the execution of the release the rest of the agreement went. It was concluded. When the money was paid, the release was executed, and the compromise was complete. There was nothing more which could be *ultra vires* of the Corporation at all; and the only argument upon which the *ultra vires* question seemed to him to have any importance was whether at the moment the agreement was executed, it could have been said that the Corporation could not come to any terms with any of these contractors unless they exercised their own discretion, and did not exercise any discretion at the request of Hunter. But then the object of the compromise was to get the £10,000. When the £10,000 was paid—as it had been—there was no more *ultra vires* in the transaction. It appeared to him, therefore, that having gone so far, the £10,000 having been paid, there being no *mala fides* in the transaction, the compromise having been so far completely effected, there was actually nothing more to be done but to execute the release. What was there of *ultra vires* in that? The whole thing came to an end when the release was executed; and he could not see that there was any harm to arise to anybody if the release was so executed. Then it was said that this was a case of champerty and maintenance; but it did not seem to him that there was any question of champerty and maintenance arising at all. Then again the question must have been a matter of some notoriety; but the parties had stood still. They had let the whole of these transactions go on from the month of August to the month of May. During that time money had been received by the Corporation; and they, in their own view, had done that which was the best for their constituents by entering into a compromise which, they believed, would be beneficial to the ratepayers. He did not think that this was a case in which he could interfere by way of interlocutory injunction, and the utmost he could do was to refuse the motion—the costs of the defendants to be costs in the action in any event.

MISCELLANEOUS NEWS.

THE LABOUR TROUBLES AT BECKTON.

The Helplessness of the Union.—Continued Intimidation.

There is little change in the situation at the Beckton Gas-Works of The Gaslight and Coke Company to report this week. Excitement among the men continues to run high; but the more intelligent of them now appear to recognise what is patent to all outsiders—the present utter impotency of their Union.

Work in No. 12 retort-house is proceeding very smoothly. Mr. West's new men (who, be it remembered, had never handled drawing and charging machines previous to their present engagement) have all settled down to their work; and the yield of gas per retort is already equal to what it was under the old system of working. The house, in fact, is now quite a model one; order and cleanliness prevailing throughout. Another set of machines was started on Thursday afternoon; and fresh hands were taught in a few hours how to manipulate them. The men, however, are subjected to a good deal of intimidation; and it has been found necessary to have a police escort for them as they pass to and from No. 12 house, and to have policemen stationed inside and outside the place. Nearly all of Mr. West's men are now "in residence" on the works. The three spacious corrugated iron buildings which the Company had erected for the very purpose of protecting themselves in the event of a strike, were not finished any too soon for the present rupture. During the past fortnight a high fence has been put up round these buildings, and other improvements effected; and henceforward the place is to be known among the unionists by the not euphonious title of "Blackleg Square." Mr. West's men seem very comfortable. Up to the present 72 beds have been fixed for them; and Mr. West has been careful to provide them with various games and papers with which to amuse and edify themselves when not on duty.

With regard to the police arrangements, there is a permanent staff for the works, consisting of one sergeant and five men; but during the past week an inspector, with three sergeants and thirty men, have taken up their abode in the place. They have quarters in "Blackleg Square," apart from the stokers; and their sleeping accommodation is all that could be desired. This large addition to the police staff, it is understood, was made on a complaint by the non-union men, of insufficient protection. Some of them, it seems, on one occasion, before they were housed on the premises, when on their way to work, were menaced with personal violence by unionists, and were prevented from reaching the works at their proper time. It was not until extra police were sent down and Inspector Vedy, of the "K" division announced his intention of remaining the whole of the following night in an office close to No. 12, that the new men felt re-assured, and settled down quietly to their duties. One case of assault was before the Magistrate at the South Woolwich Police Court last Thursday. It appears that on Monday four of Mr. West's men were crossing the river by ferry from Woolwich; and just as they were landing, some of the old stokers attacked one of them (Robert Davis), and took a bundle from him. Seeing that the men meant further mischief, he and three others got away, leaving the bundle behind, which, however, was afterwards recovered by the police. The stoker who was the principal aggressor (a man named William Pier) was subsequently apprehended in one of the retort-houses; a warrant having been issued for his arrest. When the matter came before the Court, the man was defended, on the instructions of the Gas Workers' Union, by Mr. Greenep; and Mr. Humphrys appeared on behalf of the Gas Company to prosecute. The Magistrate decided to adjourn the case for a week, in order to permit of the production of witnesses; and Mr. Watkinson, the Chairman of the Barking Branch of the Union, entered into bail for the defendant for £50.

There are very clear indications that the Union is declining in favour among stokers; and this is not surprising after the miserable muddles into which the men were foolishly led at Manchester and Salford, and in South London. At a meeting of the Barking Branch of the Union, last Sunday week, after one or two absurd epithets had been applied to Mr. West for his audacity in daring to defy the Union, a semi-admission was made that, if a strike was forced on them at Beckton, it might be very detrimental indeed to the Society. A strike there would be found a very expensive affair; seeing that there are at the present time no less than 3300 men employed on the works, from 1500 to 1600 of whom are stokers, who, we believe, are (excluding those engaged in No. 12 house) without exception unionists. Some of the men who were drawn out of No. 12 house by the Union have seen their error, and have asked to be reinstated. It has not transpired whether they obtained the permission of the Union to make this request; but they readily stated that they were quite prepared to take the risk upon themselves. Their places, however, had been filled; and only a few of the pipe-jumpers, and one or two of the men who were known to be good workmen, were re-engaged. An illustration of the bad repute into which the Union has fallen among Manchester and Salford gas stokers may be here recorded. One of the men employed in No. 12 house was walking along the Barking Road a few days since, when he was accosted by one of the officers of the Union, who inquired why he was working for Mr. West. He replied: "While I am working for Mr. West I have a living in my hands." The official tried to induce him to leave his employment; but the man said: "No; you fetched me out at Salford, and did nothing for me. I had to break up my home, leave my wife and family, and tramp all the way to London before I could get work; and now I have got some, you are trying to make me leave it again. But you won't succeed."

During the past week a great number of letters and telegrams have been received by Mr. West from all parts of the country, offering further assistance, but which is not at present required. However, should the Union have the temerity to order the men to lay down their tools, there is not the slightest doubt that Mr. West would be able, in the course of two or three days, to supply the Superintendent of the station (Mr. Beale) with sufficient hands to man the whole place.

GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.

The Half-Yearly Meeting of this Company was held last Tuesday, at the London Offices, 30, Gracechurch Street, E.C.—Mr. ALFRED WILLIAMS in the chair.

The notice convening the meeting having been read, it was agreed to take as read the Directors' report and the accounts for the six months ending Dec. 31 last, which were summarized in the JOURNAL for the 29th ult. (p. 802).

The CHAIRMAN observed that the report and accounts did not call for any remarks from him, as they were of a most satisfactory character. He would therefore simply move—"That the report and accounts be received and adopted, and entered upon the minutes."

Mr. ROBERT KING seconded the motion, which was carried without comment.

On the motion of the CHAIRMAN, seconded by Mr. KING, a dividend was declared for the half year at the rate of 8 per cent. per annum on the preference share capital and at the rate of 7 per cent. on the ordinary share capital, both less income-tax (except upon those dividends payable to the local shareholders).

The CHAIRMAN said the next business was the re-election of the two retiring members of the Board—viz., the Director at Georgetown (Mr. R. P. Drysdale) and the Deputy-Chairman (Mr. Charles Gandon). The latter gentleman, he remarked, could not be present that day, as he was away enjoying himself at Smyrna.

Both gentlemen having been re-elected,

Mr. E. K. BLYTH proposed, and Mr. C. NEWTON seconded, the re-appointment of the retiring Auditor (Mr. R. Berridge); and this was agreed to.

A vote of thanks for the services they had rendered during the past half year was next passed to the Local Director (Mr. R. P. Drysdale), the Secretary (Mr. Alfred Lass, F.C.A.), the Local Secretary (Mr. F. A. Conyers), the Engineer (Mr. T. B. Younger), the Auditors (Messrs. R. King and R. Berridge), and the Solicitor (Mr. E. K. Blyth). A similar compliment having been accorded to the Chairman and Directors, the proceedings terminated.

BELGRANO (BUENOS AYRES) GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held, at Winchester House, Old Broad Street, E.C., last Wednesday—Mr. F. A. HANKEY, M.P., in the chair.

The SECRETARY (Mr. H. M. Gerrard) read the notice convening the meeting; and the Directors' report and the accounts for the year ending Dec. 31 last were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, when the shareholders last met together, they were informed that the business of the Company was rapidly growing, and that, to meet the ever-increasing demand for gas, it was necessary to erect fresh plant and to lay down further mains. This work had been going on very successfully during the year; and consequently the business of the Company had expanded to an extent which, he thought, might be termed remarkable. During the year they had laid 14 miles of new mains; and the consumption of gas, compared with 1888, showed an increase of 52 per cent. While, however, the demand for gas was progressing, they had to contend with adverse facts—viz., an increase in the price of coal, and higher rates for freight and wages. With regard to the result of the year's trading, it was satisfactory to find that the net revenue was above that for the preceding year—the figures being £15,246, against £12,456. They had to add to the net revenue a sum of £8416, being profit on the sale of land, and the balance brought forward from 1888 of £2610. He explained the way this land came into the possession of the Company. It appeared that the Municipality of Belgrano, some three or four years ago, owed them a considerable amount of money; and being very short of cash, they offered a certain quantity of land to liquidate the debt. Under all the circumstances of the case, the Directors thought it wise to accept the land and settle the matter. Concerning the recommendations of the Directors with regard to the disposal of the profits, he said that, after making provision for depreciation, and deducting income-tax, interest on debentures, &c., and the interim dividend paid in October, the amount at the credit of profit and loss was £16,980. The Directors proposed to write off £1000 from the parliamentary and other charges, to carry £8000 to the reserve fund, and to pay a final dividend of 4½ per cent.; making a total distribution of 8 per cent. for the year. The new gasholder and other plant which they had erected, the Chairman stated, had been completed in a most satisfactory manner, and had been of material assistance in enabling the Company to keep pace with the ever-growing demands upon their resources. In this connection, he mentioned that the Company had overtaken their powers with the present capital; and before very long they would have to consider the propriety of raising further money. He also announced that the Directors had made application to the Committee of the Stock Exchange to grant a quotation of the Company's 5 per cent. debenture stock; but they were met with this difficulty—that apparently, according to the Articles of Association, the Board had unlimited powers to borrow money. Therefore it was necessary that an alteration should be made in them; and a resolution would be submitted whereby, if passed, they would get rid of the indisposition of the Stock Exchange Committee to grant a quotation. With respect to the capital account, the Directors had been successful in inducing the old shareholders who held the £30,000 of 6 per cent. debenture stock (which could only be paid off by the consent of the holders), to convert it into 5 per cent. stock; and they had since been enabled to issue the balance. The outlay on works and plant amounted to £147,866. They had written off as depreciation two sums amounting together to £3500, which brought the balance total to £144,366. The capital expenditure in 1889 was £44,428; so that up to the close of the year, they had spent on works and plant £188,795. The parliamentary and other charges amounted to £3009. During the past year, they had a Bill in Parliament to authorize an alteration in the Articles of Association; and they had also to meet the charges connected with the issue of the debenture stock. It might be of interest to the shareholders to know that it was by the perseverance of their able Solicitor (Mr. Clements) that they were enabled to have an alteration made in the Memorandum of Association, which was quite a unique feature in company life. Respecting the revenue account, the total receipts came to £83,373; and deducting the expenditure, there remained a balance of £15,246.

Mr. C. J. HEGAN seconded the motion, which was carried unanimously.

Resolutions were then passed declaring the dividend recommended, and re-electing the retiring Director and the Auditors.

On the motion of the CHAIRMAN, seconded by Mr. A. HOPPER, this resolution was then passed—"That the following article be one of the regulations of the Company, and be inserted after article 35 of the Articles of Association: Article 35*a*. The Board may borrow money on debentures or debenture stock on such terms and conditions as they shall think fit; provided always that the total amount of debentures or debenture stock at any one time issued and outstanding shall not, without the authority of a general meeting, exceed £100,000."

This concluded the proceedings.

BAHIA GAS COMPANY, LIMITED.

The Half-Yearly General Meeting of this Company was held last Thursday, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. EDWARD HORNER in the chair.

The SECRETARY (Mr. T. Guyatt) read the notice convening the meeting; and it was agreed to take as read the Directors' report and the statement of accounts for the half year ending Dec. 31 last, some particulars from which were given in the JOURNAL last week (p. 946).

The CHAIRMAN in moving the adoption of the report and accounts, referred to the remarks made at the last meeting of the shareholders regarding the administration of the affairs of the Company at Bahia. The Board, he considered, had been very fortunate in obtaining the services of their present Engineer (Mr. George Martin), who was for some years with the Nictheroy Company. When he reached Bahia, he found the works in an unsatisfactory state. But this was now altered; and the result was that for the current six months the yield of gas per ton of coal had largely increased. The Directors had previously informed the shareholders that they did not expect they would be able to pay 10 per cent. again; and he believed the impression was that they would have to reduce the dividend to 6, instead of 8 per cent. As would be seen, however, the Directors recommended a dividend at the latter figure. It would also be observed that there was an increase in the cost of coal; this being due to higher freights. With regard to public lighting, it would be remembered that the number of lamps had been reduced by 483 in 1886; but the Provincial Government had ordered some of these to be relighted. As to exchange, the rate continued at par (27d.), or thereabouts, until nearly the close of the half year; and in consequence, the loss under this head had been very small indeed. The rate had since fallen to 21d.; and this would adversely affect the current half year. In conclusion, he expressed the hope that the future of the concern would be satisfactory.

Mr. HORATIO BROTHERS seconded the motion.

Mr. J. E. JONES said he happened to know their new Manager very well, as he was a shareholder of the Nictheroy Gas Company from the commencement; and he spoke of him as an energetic worker. Referring to the accounts, he said they appeared to have an asset of £3349 owing from public establishments. This debt, taking the past half-year's revenue, was equal to about three half-years' income from that source. Then the private consumers were indebted to the Company to the extent of seven months' revenue, £7700. These were important items; and he hoped under the new management they would be considerably reduced.

Mr. FINLAY: The Manager's attention has been called to them.

Mr. JONES (continuing) said that the shareholders would be glad to learn from future half-yearly statements that the accounts had been collected better than in the past. He suggested that monthly collections should be made, and that Mr. Martin should be empowered to allow a reduction, and get the accounts paid up.

Mr. BROTHERS pointed out that the £7700 referred to by Mr. Jones included fittings as well as gas. He added that there was no doubt that the collections did get behind under the late management. Replying to further questions by Mr. Meikle, he said that they fully expected all the debts referred to would be collected. Mr. Martin entered upon his duties in November last.

Mr. HUGHES asked if any steps had been taken in respect to the renewal of the concession.

Mr. BROTHERS replied that the matter at present stood in abeyance; and it would not be wise to say anything about it.

The motion was then unanimously carried.

On the proposition of the CHAIRMAN, the usual dividends on the preference shares were declared, and also a dividend at the rate of 8 per cent. per annum, free of income-tax, on the ordinary shares.

A vote of thanks to the Chairman and Directors was unanimously carried.

The CHAIRMAN (having acknowledged the compliment) proposed, and Mr. BROTHERS seconded, a vote of thanks to the Engineer, the Secretary, and other officers.

Mr. GEORGE ANDERSON, C.E., speaking in support of the motion, said that it was a very difficult thing to manage gas-works abroad; and a man who was so engaged required all the support the shareholders could give him.

The SECRETARY having suitably responded,

On the motion of Mr. MACHELL, seconded by Mr. MAGNUS OHREN, a vote of thanks was passed to the late Secretary (Mr. A. J. Head), who had retired on account of ill-health.

Mr. HEAD thanked the shareholders for their kindness; and observed that he had been in the service of the Company for 20 years, during which time he had always tried to do his duty.

The proceedings then terminated.

THE PUBLIC LIGHTING OF BARNSLEY.

Gas v. Electric and Oil Lighting.

At the Meeting of the Barnsley Town Council last Tuesday, the minutes of the Park and Lighting Committee (some extracts from which were given in these columns last week) were presented. The minutes of a meeting of the same Committee, held the previous day, were also read by agreement, although they were not on the printed minutes. They recommended that Mr. A. Bramley Holmes, Manager of the Liverpool Electric Supply Company, should be engaged to advise and report to the Council upon the tenders submitted for lighting the town by electricity. The Committee also considered the terms in the Gas Company's letter of the 31st of March last—that the Company should supply the Corporation with gas, by ordinary lamps, at 2s. 10d. per 1000 cubic feet, representing 36s. 10d. per lamp, burning 3250 hours per annum, and consuming the same quantity of gas as heretofore; that the Corporation should pay the Gas Company an annual rental for lamps of £150; and that the gas consumed and the rental of the lamps should be subject to six months' notice at the close of any half year. The Committee, in the final clause of the minutes, suggested that the lighting, cleaning, repairing, &c., of the public lamps should be done by the Gas Company as heretofore, and that the Corporation shall pay at the rate of 53s. 6d. for each ordinary lamp per annum, each lamp to burn 3250 hours per annum, and consume the same quantity of gas as heretofore, and that the agreement be drafted and entered into on the above terms. Alderman Marsden suggested that a Committee of two or three gentlemen should be appointed by the Council to wait on the Gas Directors. Mr. Bailey asked if the Company were bound to supply the Corporation with gas? The Town Clerk said that was an awkward question to ask in public; but he might say they were not bound to supply them. A motion that the minutes be confirmed was moved and seconded; and then Mr. Bailey made a complaint regarding the time which had been allowed to elapse by the Committee, and said he should be sorry to find that they had driven the town into a corner. Alderman Blackburn, in order to show the members that the Committee had not been blind, informed them that they had had a statement prepared by lamp-makers who were willing to enter into a contract to light the town with oil. Although it would be somewhat expensive, they could light the town with oil until the electric light was ready. Alderman Marsden inquired of the Town Clerk what were the expenses attending the preliminary arrangements for electric lighting. The Town Clerk replied they would be about £400. Alderman Marsden pointed out that there was no sum mentioned respecting the cost of the services of the electrical engineer. Alderman Blackburn said it would be £50, and two guineas per day when he had occasion to visit Barnsley. Alderman Marsden remarked that he had received a letter from the Mayor of Bradford, in answer to an inquiry from himself; and he assured him that they had expended from £20,000 to £30,000 in experimenting, and they found that electricity cost twice as much as gas when it was supplied at 2s. 3d. per 1000 cubic feet. Mr. Haigh said he had no doubt that electricity would be found to be worth twice the price of gas in Bradford if it was supplied to Barnsley. It would be worth 4s. 6d. per 1000 feet, compared with 3s. 4d., the price charged for gas. In answer to a member, the Surveyor said if they spent £20,000, he did not suppose the Local Government Board would pass any scheme of electric lighting unless it was backed by some man of eminence. The tenders, he mentioned, varied from £13,000 to £25,000. Alderman Pigott said, after such a statement, he could not vote for an engineer being called in. They were told the Provisional Order would cost about £50 at first, and £200 afterwards; whilst the cost of the plant would be about £10,000. It seemed it would now cost £20,000 to light the inner area; and they would require more plant if they extended the district. After further discussion, the minutes were confirmed; only Aldermen Marsden and Pigott voting against their adoption. Mr. Woodcock then moved that three Aldermen be added to the Park and Lighting Committee, to wait upon the Gas Company with respect to the new terms proposed. It was, however, decided to leave the matter in the hands of the Committee.

CLECKHEATON LOCAL BOARD GAS SUPPLY.

Completion of a New Gasholder.

Last Saturday week, the first stage of a new undertaking of some importance to the town of Cleckheaton, was completed; and the event was marked by proceedings of considerable interest locally. A new gasholder, the first instalment of entirely new works, calculated to cost £40,000, according to the scheme projected, was "opened" in the presence of the members of the Local Board and several gas engineers from the surrounding district. The ratepayers are the owners of the existing works, which are in the township of Liversedge. The new works (which it is intended to construct as necessity may require from time to time) will be about a mile and a half distant from the old works, and in the township of Cleckheaton. Since the Local Board acquired the works from a private Company, borrowing powers have been obtained on account of the undertaking to the extent of £52,000. Up to the date of the financial statement last published (March 31, 1889), £40,400 had been expended; and the debt, deducting a large sum for the sinking fund, was about £29,000. There has been a rapid increase in the quantity of gas consumed; and the works are unequal in the lighting season, except under pressure, to a production to meet the demand. The great drawback, however, is in the storeage; and to overcome this, the new holder has been built. In 1874, the gas sold was 15,957,000 cubic feet; and in 1888, it reached to 49,808,000 feet. As the consumption increased, the price was reduced. From 4s. 6d. per 1000 cubic feet, without discount, in 1874, the price had fallen to 3s. 2d., with 10 per cent. discount, in 1888. The works pay at the rate of about 9 per cent.; and after allowing for interest on loans and payments to the sinking fund, there is a surplus left for the relief of the general rates. In the scheme for the new works, provision is made for three large gasholders, retort-houses, and other premises for the manufacture of gas on a much more extensive scale than at present. Space is allowed for one holder with a capacity of a million cubic feet; and two others each of a capacity of 500,000 feet. It is one of the latter that has just been finished. The whole of the designs in connection with this work have been prepared by Mr. G. H. Niven, the Board's Engineer. The holder is in two lifts; the inner lift being 120 feet, and the outer one 122 feet. Each lift has a depth of 50 feet. The holder is supported by fourteen lattice standards of wrought iron, connected by three sets of wrought-iron girders, and interlacing wind-ties. The tank containing the holder is built of cement brickwork rendered in the front, instead of puddled. The bottom is formed of concrete 2 feet thick. Adjoining the tank is a temporary building containing a gas-engine for working an exhauster. There is also the accompanying governor and pressure register.

The inauguration of the holder was made the occasion of a short ceremony, at which, among others, the following gentlemen were present: Mr. L. Stead, Chairman of the Local Board; Mr. G. Crossley, Chairman of the Gas Committee; Mr. W. Isherwood, ex-Chairman of the Committee; Mr. G. H. Niven, the Gas Engineer; together with Mr. Gould (of Messrs. Gould and Stevenson, of Leeds, the contractors for the tank), and Mr. Percy Holmes (of Messrs. W. C. Holmes & Co., of Huddersfield, the contractors for the holder). Mr. Isherwood said the enterprise which they were inaugurating not only had relation to the lighting of the public streets, but to the trade of the town. Gas had become a necessity in their manufactures, especially in the wire-trade. The present was a very great undertaking; and no doubt many years would elapse before it reached completion. Amongst other schemes that the Board had in view, was the connection of railway sidings with the site of the new holder for the more convenient conveyance of coal and the dispatch of residuals. The Gas Committee had plenty of work to do for many years to come; and he hoped they would act harmoniously together and show as successful results financially towards the relief of the rates as they had done in the past. He then turned the lever admitting the gas into the holder.

The contractors for the work invited between forty and fifty gentlemen to a banquet in the evening. The Chairman of the Gas Committee (Mr. Crossley) presided. Most of the members of the Local Board were present, together with Mr. Niven, Mr. W. Oldfield, of the North Bierley Gas-Works, Mr. Midgley, of the Colne Valley Gas-Works, Mr. J. Niven, of the Clayton, Allerton, and Thornton Gas-Works, Mr. Gould, and Mr. W. C. Holmes. In responding to "The Health of the Engineer," Mr. Niven spoke of the great urgency of increased producing capacity at the old works. These works, he said, had a productive capacity of 30 million cubic feet per annum; but they were sending out close upon 70 millions.

ULVERSTON LOCAL BOARD GAS AND WATER SUPPLY.

The Past Year's Working—Abolition of Meter Rents.

At the last Monthly Meeting of the Ulverston Local Board, the minutes presented by the Gas and Water Committee stated that the annual report of the Manager (Mr. J. Swan) had been considered at a special meeting. The profits realized by the gas undertaking in the year ending March 25 last were £761 4s. 5d.; and by the water undertaking, £249 16s. 7d. The Committee proposed to carry £200 to the reserve fund, and use £200 for extensions of the works and mains. On the same occasion, the Finance Committee presented a report, in which reference was made to the Accountant's financial statement, and to his estimate for the new general district rate for the current year. From the latter, it appeared that the total estimated expenditure was £3766; and the Committee remarked that if the unappropriated balance of £361 in connection with the gas undertaking were employed in the purchase of the gas-meters belonging to the consumers on a fixed system of depreciation, and in the abolition of future meter-rents, as had been proposed, a general district rate of 2s. 4d. in the pound would be required; whereas if the surplus were applied to this rate, it could be reduced to 2s. 2d. They recommended that the water profits should be placed to the general district fund account. The propositions of the two Committees came before the Board under somewhat trying circumstances, inasmuch as the relations between these bodies have lately been somewhat strained, owing to the Gas and Water Committee having, according to the Chairman of the Finance Committee (Mr. Hodgson), usurped to a certain extent some of their functions. After some preliminary conversation on this point, Mr. Hodgson proceeded to make his financial statement. He said the accounts of the Board for the past year were, on the whole, very favourable—indeed, more favourable than had been anticipated. To begin with, the gas-works fund and the receipts from gas and meter rentals were £4013, against £3931 in 1888-9. The amount recovered for tar was £92, against £39. This £92 was an old account, which they fully expected to have to write off, but which fortunately had been paid. The receipts for tar amounted to £214, against £129 in the previous year—a considerable increase, which was owing to the advance in the price of residuals. Sulphate of ammonia sold for £228, against £219; coke, £570, instead of £415. The other items of revenue were pretty much the same; the total receipts being £5349, against £4899. They had been arrived at by an expenditure of £1516 for coal and cannel, against £1487. It appeared that £70 more had been made by the sale of gas, and only £30 more had been spent for coal and cannel. This was owing, no doubt, to improved stoking arrangements, and the economy which had been exercised by Mr. Swan, for which he was entitled to great credit. The other items of expenditure were very similar to those of the previous year, except that the repairs and lighting of lamps cost £112, against £160, owing to fewer repairs and renewals of services. The account showed a profit of £761, as against £313. He was sorry to say, however, he could not call this all profit. The old account of £92 could hardly be considered profit, neither could an amount for coal sold, which was included in the total. He took it that £450 was the actual profit realized from the gas undertaking; but £761 was shown, and

this amount had to be disposed of. The water-works had yielded a profit of £249, against £151 in the preceding year. Having referred in detail to other items of the accounts, he passed on to the estimates for the current year, which showed a net expenditure of £3766 18s. 3d. to be raised. Of the £761 profit on gas account, it was proposed to place £200 to the reserve fund, making it £600, and £200 for renewals, which he contended ought to have come out of the year's account; leaving the Board to decide what was to be done with the balance of £361—whether they would use it for abolishing the meter-rents, or for reducing the district rate by 2d. in the pound. The proposition was that every meter which had been paid for should be bought, under a fixed system of depreciation; and that all meters fixed by the Board should be free after the 25th of March—leaving the district rate at 2s. 4d. in the pound. Mr. Atkinson seconded the proposition. Mr. Pearson thought the proposal too sweeping. He considered one way of increasing the consumption of gas would be for the Board to defray the cost of putting pipes into the houses which were at present without a supply of gas. He therefore moved an amendment, that, instead of the £361 being used in the manner proposed, it should be applied in the reduction of the district rate. Mr. Dodgson, in seconding the amendment, said he had no objection to the gas-meters being free, but the change should be brought about gradually. Mr. Hodgson having replied, the amendment was put and lost by a majority of one; the original proposition being carried. The decision is regarded in the district as a very business-like one, and comes well as a supplement to a reduction of 3d. per 1000 cubic feet (bringing it to 3s. 6d.) in the price of gas, and an allowance of discounts to large consumers, granted last year. The removal of the meter-rents will entail a loss of £70 per annum; but it is expected that this will be nearly, if not entirely, made up by an increased consumption of gas.

The following are some statistics of the working of the gas undertaking during the past year:—The gross cost of gas was £2900 14s. 1d.; being at the rate of 26s. 7·61d. per ton of coal carbonized, 2s. 5·01d. per 1000 cubic feet of gas made, and 2s. 6·40d. per 1000 feet sold. The net cost was £1480 4s. 10d.; being at the rate of 13s. 7·11d. per ton of coal carbonized, 1s. 2·81d. per 1000 cubic feet of gas made, and 1s. 3·53d. per 1000 feet sold. The gross profit was £2450 19s. 7d.; being at the rate of 22s. 6·08d. per ton of coal carbonized, 2s. 0·56d. per 1000 cubic feet of gas made, and 2s. 1·71d. per 1000 feet sold. The figures for the net profit are: £761 4s. 5d., 6s. 11·88d., 7·63d., and 7·99d. The quantity of coal and cannel carbonized was 2178 tons; the gas made being 23,959,800 cubic feet, or at the rate of 11,000 cubic feet per ton of coal. Of the total make of gas, 22,878,300 cubic feet were sold—being 95·48 per cent. of the production; and of this 88 per cent. went to private consumers. The residuals produced per ton of coal carbonized were: Coke and breeze, 7·3cwt.; tar, 15 gallons; sulphate of ammonia, 23·09 lbs. The capital invested in the undertaking is £30,869 7s. 4d.; being at the rate of £14 3s. 5d. per ton of coal carbonized, £1 5s. 9d. per 1000 cubic feet of gas made, and £1 7s. per 1000 cubic feet sold. The illuminating power of the gas is 19·52 candles.

GAS-METER TESTING IN MANCHESTER.

The Official Inspector of Gas-Meters in Manchester (Mr. J. Urquhart) has lately presented to the Justices of the Peace of the city his report for the year ending March 31 last. During this period, 11,465 meters were tested—9752 being wet, and 1713 dry meters—the fees charged amounting to £367 2s. Compared with the preceding year, there is a gain of 2950 meters, and £85 4s. in fees. This increase Mr. Urquhart attributes in a great measure to a recently established local firm of meter makers, who have extended their business largely beyond Manchester and the district; and therefore other than local fees have been paid into the city exchequer through the medium of the meter-testing department. The expenditure last year was £279 16s. 7d. in excess of the receipts; but this was £94 17s. 8d. less than the adverse balance the preceding year. The percentage of rejected meters on the gross number tested was 3·75, against 5·84 the previous year. Wet meters show a percentage of 1·66 rejected, and a mean of error of 3·5 per cent. fast and 4 per cent. slow. Dry meters show 15·7 per cent. rejected, and a mean of error of 15 per cent. fast and 22·5 per cent. slow. The total number of meters tested since the Sale of Gas Act came into operation in 1862 is 260,388; the fees received amounting to £8177 5s. 11d. Appended to the report are particulars in tabular form of the number and sizes of meters tested, &c.

Dispute as to a Charge for Meter-Rental in New Orleans.—A correspondent has sent us particulars of a curious dispute, resulting in legal proceedings, which arose a short time ago between the New Orleans Gas Company and one of their customers. It appears that the Harmony Club in that city decided on abandoning gas for the electric light; keeping the former illuminant as a stand-by in case of failure of the latter. Finding that the gas bills were considerably reduced, the Company intimated their intention of removing the large meter (a 45-light one) which had been required under the old arrangements, and substituting a smaller one, or making a charge for the meter fixed. The club authorities protested against this, and applied to the District Court for an injunction to restrain the Company from taking away the meter. One of the rules of the Company is that a large meter such as the one in question is only supplied or continued when the gas bill amounts to $8 per month; and if the consumption comes to less, another rental of $4 per month can be claimed. In view of this, the application for the injunction was dismissed. Thereupon the plaintiffs appealed to the Supreme Court, who confirmed the decision of the Court below. The question turned upon the right of the Company to charge the extra $4 per month; but the Court took the very common-sense view that this is really the rental of the meter, for the use of which the Company were assuredly entitled to be paid, seeing that the profit on the gas passed through it had been reduced by the restricted consumption.

METROPOLIS WATER SUPPLY.

The Quality of the Water during the Month of April.

The returns furnished to the Registrar-General by the London Water Companies on the water supply of the Metropolis during the past month, show that the average daily supply was 165,831,363 gallons; being at the rate of 27·9 gallons per head of the population, as compared with 26 gallons in April, 1889. Of the entire bulk of water sent out, 83,020,393 gallons were drawn from the Thames, and 82,810,970 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: "Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies, and by the Tottenham Local Board of Health, was: Kent, 0·6; New River, 0.7; Tottenham, 1·0; Colne Valley, 1·6; Lambeth, 1·8; Grand Junction, 2·0; Chelsea, 3·3; West Middlesex and Southwark, 2·4; and East London, 2·5. The water drawn from the Thames by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies was in every case efficiently filtered, and exhibited, for river water, a high degree of organic purity. The water obtained chiefly from the River Lea by the New River and East London Companies was also efficiently filtered. That of the New River Company was of a very high degree of organic purity; whilst the East London Company's supply was slightly inferior in this respect to all the Thames-derived waters. The deep-well waters of the Kent and Colne Valley Companies and of the Tottenham Local Board of Health were, as usual, of a high degree of organic purity. The Kent and Colne Valley waters were clear and bright; but the Tottenham water was again slightly turbid owing to suspended particles of rust of iron. The supply of the Colne Valley Company was the only soft water delivered in London."

Messrs. Crookes, Odling, and Tidy, in the course of their report to the Official Water Examiner (General A. de Courcy Scott), on the quality of the daily samples of water supplied in London during April, say: "The character of the water furnished to the Metropolis during the month of April was not found to differ appreciably from that observed during the previous month. Thus, taking the Thames-derived water for comparison, the mean proportion of organic carbon present in the supply for April was found to be 0·148 part in 100,000 parts of the water, as against a mean of 0·154 part in the supply of the previous month. Again, the mean amount of oxygen absorbed in the oxidation of the organic matter present in a gallon of the April water was found to be 0·039 grain, as against a mean of 0·041 grain for the water of the previous month; while the fraction indicating the mean degree of colour-tint of the April water was $\frac{20}{12\cdot1}$ as against $\frac{20}{11\cdot9}$ for the previous month—all these differences being insignificant, but the last-named being in the opposite direction to the other two."

NEW RIVER COMPANY.

Sale of an Entire Share in the King's Moiety.

At the Auction Mart, Tokenhouse Yard, E.C., last Wednesday, Mr. E. H. Bousfield (Messrs. Edwin Fox and Bousfield) offered for competition an entire King's share in the New River Company. This was the first occasion since the formation of the Company, something like three hundred years ago, on which a whole share in the King's moiety has been sold by auction at one time. In his opening remarks, the Auctioneer referred at some length to the history of the Company. He mentioned the fact that in the past twenty years the revenue, had nearly doubled; and stated that, as all the circumstances which had conduced to this enormous addition to the revenue were still in operation, there was no reason why in the course of the next twenty years there should not be a like increase. In spite of the Auctioneer's glowing account of the prosperity of the concern, and his references to its brilliant prospects, the bidding was extremely slow—indeed, it was only after a pause that he succeeded in getting an offer of £80,000. From this point the bidding gradually reached £95,100, at which figure the lot was knocked down. It will be remembered that in July last an Adventurer's share in the New River Company was sold by the same firm at £122,800; the only difference between the two shares being that the possession of an entire Adventurer's share qualifies the holder for a seat on the Board, while the King's shares are subject to a small tax, and the holders take no part in the management.

The Northampton Electric Lighting Company and the Hardingstone Local Board.—An inquiry was recently held by Major F. A. Marindin, R.A., C.M.G., one of the Inspectors of the Board of Trade, into the matter of the application of the Northampton Electric Light Company for a Provisional Order, as far as it related to the district of the Hardingstone Local Board—the latter having twice refused the application of the Company, and the third time the voting was equal on the point of rescinding the former resolution of the Board, so that the matter was allowed to remain *in statu quo*. On behalf of the Company, it was pointed out that it would possibly, under the circumstances, be extremely difficult for any Company in the future to obtain parliamentary powers for lighting the district; and it was contended that a sufficiently representative opinion had been obtained in favour of the application. The Board based their opposition on the fact that the Company was, in their judgment, under-capitalized; also that considerable expense had been incurred by them in putting the footpaths in order, and it was felt that if the Company disturbed them, they would not be re-laid in as good condition as they were at present. Major Marindin has since reported that, in his opinion, the promoters have not shown sufficient cause for dispensing with the consent of the Board; and he recommends that the area under their jurisdiction be struck out of the Order.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

In considering their coal contracts this week, the Gas Committee of the Aberdeen Town Council were greatly assisted by the way in which Mr. Alex. Smith, the Gas Manager, presented the subject to them. He had divided the tenders into three groups. The first showed an average price of 22s. 1d. per ton, delivered at the works. The coal—32,000 tons—would produce 26·6-candle power gas, and would cost £35,425; being an increase over last year of £9865, and representing an addition to the cost of gas of 8d. per 1000 cubic feet. The second group for the same quantity of coals, included the offers of eighteen firms. The average price was 19s.; the candle power, 25; and the cost, £30,404 10s. This was an increase of £4482 on last year; and represented an increased cost of 4d. per 1000 cubic feet of gas. The third (for the same quantity) showed an average of 17s. 11d.; a candle-power of 23·8; and a cost of £28,700. This was an increase of £3140; and represented an increased cost of 2½d. per 1000 cubic feet. It was resolved to recommend that the second group be adopted.

The Dundee Gas Commission possess a large sinking-fund—£30,000—and as opportunity arises they take advantage of it to apply a portion of the fund for the extinction of annuities. Such an opportunity arose yesterday, when annuities to the amount of £134 10s. 8d. were put up for sale by auction. These were exposed in 27 lots, all of which were acquired by Mr. T. Thornton, the Clerk to the Commission, for a total sum of £4036, which is equal to 30 years' purchase. When the Commission was constituted in 1868, the amount paid yearly in annuities was £8662 10s.; but this they have now reduced by nearly £1000. Capitalized at 25 years, the annuities amounted to £216,563; and this sum they have now reduced by more than £25,000 in 22 years—leaving about £180,000 still to be redeemed. At the beginning of the financial year which has just expired, a proposal was made that the capital debt of the Commission, amounting to about £150,000, should be reduced by paying off mortgages out of the sinking fund. How much, if anything, has been done in this way, I cannot say; but the question of how to lighten the financial burdens of the Commission—which, by the way, are not at all onerous—has been under consideration for nearly the whole of the year.

The purifiers which the Arbroath Gas Corporation recently purchased from the Glasgow Gas Commissioners, have been removed to Arbroath. They were conveyed in a special train last Sunday; that day being selected because a portion of the material projected beyond the ordinary limit, and it was necessary that one of the lines of rails should be blocked to allow the train to pass. Mr. Carlow is preparing a site for the purifiers at the gas-works. For this purpose a pit is being dug, 64 feet long by 54 feet broad, and 9 feet deep, which is to be floored with concrete, and the sides built with rubble. The purifiers will rest on brick piers within the excavation.

An action has been brought before Lord Trayner in the Court of Session, in which Messrs. Thomas Owens and Sons, of Leith and Bo'ness, sue the Bo'ness Gas Company for damages to the amount of £258 9s. 5d., for loss occasioned by the explosion of gas in the roadway opposite pursuers' Bo'ness works last November. Pursuers say that the explosion occurred in consequence of a leakage from defendants' main, which resulted from defective laying of the pipes. The gas entered the dwelling-house of pursuers' foreman at their works, and was, it is believed, ignited by the kitchen fire. By the explosion, the foreman's house was wrecked, and a great deal of damage was done to an adjacent laboratory and to the roof of two sheds. Defenders say that their main was carefully laid, and suitably jointed, that it had given the utmost satisfaction during the four years it has been laid, and that in all probability the main was injured by heavy traffic passing over it. They deny fault or negligence, and plead that they are entitled to absolvitor, in respect that the leakage of gas was known to defenders' foreman the previous evening, but no notice was sent them, so that they might have taken steps to remedy it.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

The Partick, Hillhead, and Maryhill Gas Company's Bill has been rejected by the House of Commons Committee. As I mentioned in my last budget of "Notes," it came before the Committee for consideration yesterday week, and on Tuesday of this week consideration of it was resumed. After the witnesses on behalf of the Company had given evidence, some few were examined on behalf of the Glasgow Corporation; and shortly afterwards the Chairman declared that the Committee were of opinion that the preamble of the Bill had not been proved. On the following morning, Mr. Littler delivered a very stiff address to the Committee, in the hope that they might be persuaded to alter their finding; but it was of no avail.

At a meeting of the Stirling Town Council last Monday, the Clerk read a letter from the Stirling Gaslight Company intimating that the Directors had resolved, owing to the increase in the price of coal and lime, and the advance of workmen's wages, to add 2d. per 1000 cubic feet to the price of gas (making it 3s. 9d.) from and after the 15th inst. A corresponding increase would fall to be made on the price of the gas for public lighting. The letter was remitted to the Lighting Committee to be dealt with.

It is stated that the Bathgate Gas Company have advanced the price of gas 1od. (to 5s.) per 1000 feet.

Offers for extending the Wishaw gas supply into the district of Craigneuk—an outlying portion of the burgh—have been accepted by the Burgh Gas Commissioners. Messrs. Laidlaw and Sons, of Glasgow, will supply the pipes and other castings. The total cost will be a little over £1000.

The Glasgow pig iron market closed on Wednesday afternoon for the holidays. Up to that time, the price of Scotch warrants had fallen from 44s. 11d. to 42s. 2d. per ton cash.

Values in the local coal trade have been fairly well maintained during the week. Here and there, however, in order to foster business, slight concessions in price have been made by merchants and coal-masters.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 24.

Sulphate of Ammonia.—The more urgent present requirements having been fairly filled, a quiet feeling has prevailed; buyers having again shown a passive disposition, probably in the hope of creating an unfavourable effect upon market values. This is, however, only a repetition of what took place quite recently; and the present indifferent tone may be but temporary. It is not to be expected that there will be much improvement next week; the usual holiday feeling being manifest. There is, however, comparatively little sulphate on offer, which of itself is insufficient to create further depression. Besides it is likely that there will be some interruption to the manufacture for a week or two. The quotations are reduced to £11 5s. f.o.b. Hull; and about the same figure for delivery at Leith. No business appears to have taken place in forward contracts; but this is mainly owing to the fact that sellers are firm in their resolution not to sell except at a considerable premium upon present values.

LONDON, *May* 24.

Tar Products.—There is no alteration in this market to call attention to since last week's report. Benzoles continue strong; and there is no disposition on the part of makers to sell excepting at advanced prices. There has been but little doing in other products.

Sulphate of Ammonia has again become quiet, which, however, is not unusual at the present time of the year. The price may be taken at £11 5s. to £11 7s. 6d. per ton, usual London terms.

Wakefield Corporation Water Supply.—It was reported by the Water Committee at the last meeting of the Wakefield City Council that they had recommended to the Finance Committee that a sum equal to a rate of 1s. 2d. in the £1 be included in the estimate for the new general district rate for the purposes of the water-works.

The Divining-Rod.—Mr. William Scott Lawrence, of Bishopston, has [says the *Bristol Times*] just met with another decided success with the use of his divining-rod on the farm of Mr. Prout, at Frampton-on-Severn, where he was requested to meet a number of persons to witness the results. Mr. Lawrence marked two spots, where he stated springs of water would be found; and in each case, after boring about 10 feet, water was struck, and rose to within 6 feet of the surface. But as many persons said that water might be found in any other part of the field which Mr. Lawrence had passed over, the tenant, to test this matter, directed the men to bore in another part to the same depth, and the result proved the subsoil to be perfectly dry. Both the steward and tenant consider the trial to be most satisfactory, and that Mr. Lawrence possesses, in a most remarkable degree, the power of finding water by aid of his divining-rod.

Completion of Water-Works for Uckfield.—Water-works for the supply of Uckfield have just been completed, under the supervision, and from the plans of, Mr. H. Bertram Nichols, C.E., of Birmingham. Mr. Nichols's scheme for Uckfield necessitates pumping; gravitation not being available. A well has been sunk, and a borehole carried down to a depth of 278 feet into the water-bearing strata of the Ashdown Sands underlying the Wadhurst clay. The water rises in the well to within 7 feet of the surface, and is pumped into the service reservoir, which has a capacity for seven days' full supply. An interesting feature of the scheme is the motive power for raising the water, which is a petroleum engine supplemented by wind power. The windmill, of the "Halliday" pattern, is carried up to a height of 90 feet. Both the motors are said to answer their purpose admirably. The scheme was promoted by a private Company; and the cost has been £3278, irrespective of land, parliamentary, and other charges.

The Closing of the Cardiff Electric Lighting Station.—In reference to the paragraph on this subject which appeared in the JOURNAL for the 6th inst., it seems that the Cardiff Brush Electric Engineering Company are not going to give up without a struggle for life. A letter from them was read at last Tuesday's meeting of the Cardiff Lighting Committee, in which, after a touching allusion to the "many years" during which they have carried on their electric lighting system, they seek to obtain an assurance from the Corporation that they will assent to their application next year for a Provisional Order for the supply of electric light in Cardiff. In support of this application, they point out that in the interests of the ratepayers it would be better that the electric light should be supplied by private enterprise, as the competition with gas would have the result of private consumers being supplied with the "best" light on the most favourable terms. In the event, however, of the Corporation applying for parliamentary powers for the supply of electricity, the Company express their willingness to act as contractors for them, or to enter into an agreement to take over the Order upon fair and reasonable terms. The Committee resolved to hold a special meeting on an early date to consider the advisability of recommending the Corporation to apply for a Provisional Order.

Proposed Extension of the St. Helens Gas-Works.—A special meeting of the St. Helens Town Council was held last Wednesday, to consider the proposed application of the Council for a Provisional Order, amending and altering the provisions as to the borrowing and reborrowing powers of the Corporation for the purpose of extending the gas-works. Alderman Pilkington said the Council required £18,000 for the extensions; and they could not, under their borrowing powers, borrow any more money. It was intended that they should apply for the borrowing powers being increased from £250,000 to £350,000. He moved that an application for a Provisional Order, amending the provisions as to the borrowing powers, be made. Alderman Gamble seconded the motion; remarking that the requirements of the town demanded another gasholder. Mr. Brown said he could not agree to the application for borrowing £18,000, and thought a tabulated statement showing the consumption of gas for the past few years should be prepared. He moved an amendment to this effect, which was seconded by Mr. Hatton. It was pointed out that it was absolutely necessary that the gas-works should be extended; the holder capacity being altogether insufficient for the requirements of the town. Mr. Brown, on being appealed to, withdrew his amendment, and the motion was carried.

Stoking Machinery for the Bradford Gas-Works.—The Gas Committee of the Bradford Corporation have decided to instal West's stoking machines in one of their retort-houses containing about 400 retorts.

Another Death from Electricity in New York.—A man who was engaged in cleaning the windows of a New York bank on the afternoon of the 17th inst., lost his balance and fell backward. In his descent he struck the electric lighting wires, and was instantly killed.

Buenos Ayres Water Supply and Drainage Company, Limited.—A meeting of this Company was held last Tuesday at the London Offices, Gresham House, E.C., under the presidency of Mr. H. R. Grenfell, at which the resolutions passed on the 29th ult. (*ante*, p. 850), making alterations in the Articles of Association, were confirmed.

The Rayleigh (Essex) Gas-Works.—Mr. H. Brown, of Southend, who, as announced in the JOURNAL last week, has lately purchased the Rayleigh Gas-Works, has arranged for Mr. Hugh Baillie to manage them. Mr. Brown intends to have the works remodelled on modern principles; and also to carry out an extension and alteration of the mains and services.

Mr. Norbury Williams and the Manchester Corporation.—A Committee has been formed, with Mr. H. H. Howorth, M.P., as Chairman, to raise funds for defraying the expenses of Mr. Norbury Williams's defence to the action brought against him by the Manchester Corporation, in consequence of the charges recently made by him in respect of certain persons connected with the Gas Department.

Electric Lighting for Cambridge.—The Cambridge Town Council have taken the first step towards carrying out the powers of electric lighting, with which they have been invested by the Provisional Order granted them by the Board of Trade. On the recommendation of the Electric Lighting Committee, they have resolved to enter into a provisional agreement for the purchase of 4831 yards of land, at a cost of £1041, on which to erect a central station.

The Bolton Corporation Water Undertaking.—The annual statement of accounts in connection with the Bolton Corporation waterworks has just been issued. The total income in the past financial year was £50,052—an advance of more than £2000 upon the previous twelve months' working; and the expenditure was £36,280, or £1500 less than before. The profit is £13,775; and the Committee have decided to hand over £12,000 of it to the borough fund in relief of the rates—this being £3000 more than in 1888-9.

Electric and General Investment Company, Limited.—The prospectus of this Company, which has been formed primarily for the purpose of facilitating the promotion and development of undertakings for electric lighting, traction, transmission of power, and for other industrial uses of electricity, has been issued, announcing a capital of £200,000 in 40,000 £5 shares, of which 100 are founders', and the remaining 39,900 ordinary shares. The present issue is of £100,000 in 20,000 ordinary shares, and £500 in 100 founders' shares.

Sale of Shares.—Yesterday week, a miscellaneous collection of shares were sold by auction at Heckmondwike; among them being eight "A," ten "B," and sixteen "C" shares in the *Heckmondwike Gas Company*, which were sold at £11 12s. 6d., £4 12s. 6d., and £9 respectively per share. Twenty "D" shares (ex-dividend) sold at £7 15s.; and twenty-two at £8 5s. Ten £5 (paid-up) shares in the *Gomersal Water Company* realized £9 2s. 6d. Ten £1 shares in the *Poulton-le-Fylde Gas and Coke Company* were knocked down at £1 each.

Strike at the Rathmines Water-Works.—The men employed on the reservoir which the Rathmines Commissioners are constructing at Glenismole recently "went out" on strike. They demanded an increase in their wages from 15s. to 16s. a week, and a half-holiday on Saturday. Through the interposition of the Rev. R. Quinn, C.C., the men resumed work yesterday week, at the old rate of wages, on the understanding that the Engineer would recommend that increased wages be paid to the men employed on the more difficult sections of the work.

A Hitch in the Malvern Water-Works Scheme.—The Local Board of Malvern having decided to spend between £30,000 and £40,000 in improving the water supply, gave the usual notices to apply for a Provisional Order, enabling them to acquire 13 acres of common land for the purpose of a reservoir, pumping-station, &c. A letter has just been received from the Local Government Board, stating that in face of clause 10 of the Malvern Hills Act, 1884, which reads, "From and ever after the passing of this Act, no enclosure shall be made or building erected on the lands subject to this Act," they cannot grant the Order asked for. The scheme consequently falls through.

Heywood Corporation Water Supply.—The annual report of the Heywood Corporation water undertaking has been issued by Mr. J. Diggle, C.E., the Water and Borough Engineer. It shows a loss for the twelve months ending March 25 last, of £1699 1s. 9d., as against a loss for the previous year of £621 11s. 8d., and also for the year before that of £1356 4s. 4d. This apparently large deficiency includes £1325 for the redemption of annuities and loans, and £101 for expenses in connection with the promoting of the Heywood Corporation Act, 1889. Payments on capital account have been made to the amount of £15,124 6s. 5d.—making a total expenditure to March 25 last of £254,035 5s.; and the charges against revenue account include interest upon the entire outlay in connection with the Clay Lane new reservoir works and plant (not less than £1400 per annum). The gross annual income for water represents an increase of £867 11s. 1d. within the past three years; and the allowance for "empties" has decreased by £118 16s. 4d. Should this rate of increase continue, the finances of the undertaking will soon become in a flourishing condition. The works in connection with the new reservoir, which have cost £43,419, continue perfectly satisfactory.

Gainsborough Water Supply.—The Gainsborough Local Board Water Committee are still experiencing trouble with the well from which great things were expected, but which has proved a very expensive undertaking and of little use to them. They reported, at a meeting of the Board yesterday week, that they had had some correspondence and an interview with the contractor (Mr. Timmins), and had suggested that he should pay £150 instead of completing his contract to make the well water-tight, and that the Board should hire the present pumps for £80 for twelve months. This was agreed to; and it was resolved to accept the contract of Mr. Chapman, of Salford, for a new well for £1875.

Proposed Electric Lighting of Woking.—The Parochial Committee of Woking have decided to ask the permission of the Rural Sanitary Authority to enter into negotiations with the local Electric Lighting Company, with a view of coming to some arrangement for the lighting of the streets. The Company have offered to erect and maintain, free of cost to the Authority, lamp-posts and supply current for a 16-candle power light at a cost of £3 10s. per lamp per annum; not less than 50 lamps to be taken in the first instance. The price they offered was calculated on a basis of 6½d. per Board of Trade unit; whereas, under their Provisional Order, they are entitled to charge 8d. per unit.

Reading Corporation Water Supply.—The minutes presented by the Water Committee at the last meeting of the Reading Town Council embodied a report by the Water Manager on various improvements which he proposed should be made in the works, involving an outlay not exceeding £11,791, whereby the supply would be augmented and raised in quality. The Committee stated that, pending the result of the steps which they intended to take in accordance with the Manager's recommendations, they resolved to suspend further consultations with Mr. James Mansergh on the subject of his proposed scheme for a new supply of water to the borough, which was described in the last volume of the JOURNAL (p. 654). The minutes were approved.

Gas Exhibition and Cookery Lectures at Bristol.—Last week, Messrs. T. Fletcher and Co. had an exhibition of gas cooking and heating apparatus at the Colston Hall, Bristol, under the auspices of the Bristol Gas Company. With the view of practically demonstrating the superiority of gas cooking over all other methods, and the economy resulting from the use of appliances such as those shown, Miss Kelman, of the South Kensington School of Cookery, gave lectures twice daily, which were attended by large audiences. This is the third occasion on which Messrs. Fletcher and Co. have exhibited their appliances in Bristol; and the success of their enterprise may be judged from the fact that something like 2000 of their stoves have been fitted up in the city alone through the agency of the Gas Company.

Freaks of Lightning.—At Ashton-under-Lyne a peculiar incident was recently witnessed during a thunderstorm. The electric fluid ran down the conductor of the large chimney-stack belonging to the Hurst Mills Company, Limited. At the bottom of the chimney there is a tank in which the end of the wire is inserted, to disperse the electric fluid; and this tank being empty, the lightning struck the ground, bursting the gas-pipes under the flags, with a terrific explosion, and lifting half-a-dozen immense flags out of their places. It also burst the pipe about 20 yards down Queen Street. In a house close to where the last accident took place, where the toll-keeper and his wife lived, the gas entered in immense volumes from the burst main, and caused another explosion, rendering both occupants for a time unconscious.

North Shields Water Company.—In the report of the Directors of this Company, which will be submitted to the shareholders at their meeting next Thursday, it is stated that the number of new services put in during the past year was 38, for the supply of 49 new consumers. The gross revenue was £9823 12s. 5d.—an increase of £281 13s. 3d. over the previous year. This is, to a certain extent, due to crediting to revenue account the amount received for the hire of meters. The expenditure was £6678 15s. 6d., including interest on loans and the amount paid to the Newcastle and Gateshead Water Company; and it shows a balance of profit of £3144 16s. 11d. The Directors recommend a dividend of 2½ per cent., which will make with the interim dividend paid on the 1st of January last 4 per cent. for the year. This will amount to £1500. His Grace the Duke of Northumberland's one-seventh share of the clear annual profit for the year ending the 1st inst., payable in September, amounts to £649 14s. 11d. After the payment of these amounts, a balance of £436 18s. 5d. will remain to the credit of the profit and loss account.

Opening of New Sewage Works at Hereford.—The Midland Counties district meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held at Hereford last Saturday week, when the occasion was taken advantage of to formally open the new sewage outfall works. The members met in the Council Chamber, under the presidency of Mr. H. Percy Boulnois, of Liverpool, when the City Surveyor (Mr. I. Parker, C.E.) read an interesting paper on the "Hereford Sewage and Municipal Works," in which he stated that the works were, in the first instance, designed by himself; Mr. E. Cousins, C.E., being appointed Consulting Engineer. The cost of the whole had been about £36,000. The members, accompanied by the Sewage Outfall Committee, then proceeded to the new works in brakes. Alderman Scobie, acting for the Committee, handed the works over to the Mayor on behalf of the Corporation and the citizens; and in doing so briefly gave a history of the proceedings in connection with them. The party afterwards returned to the city and inspected the water-works. Later the Mayor entertained the members of the Association to luncheon.

The Northern Coal Trade.—The northern coal trade has been a little brisker during the past few days, as is not unusual about holiday time; the output being then reduced, and the demand being slightly in excess of the normal rate, to make up for stoppages. Steam coal has been in very good request, and best Northumbrian qualities have commanded about 13s. per ton, free on board ship. Small steam coals have also been brisk, and sell at 8s. 6d. to 9s. per ton. In gas coal the demand is good, especially for export. For prompt shipment, best Durham gas coal commands from 12s. 6d. to 13s. per ton, less discount. A contract has just been entered into for delivery in the autumn of next year; and for best gas coals so delivered next year (about 50,000 tons in quantity) it is said that the price paid is 11s. per ton, which, under all the circumstances, is a very good figure. There is a fair demand for bunker coals for delivery over the next few days; but for later sale the price is a little weaker. Manufacturing coals are

steady; but household coals are very dull, and lower prices are expected to rule. Coke is slightly steadier in price for blast-furnace qualities. Gas coke is firm.

Gas Affairs at Bingley.—On the recommendation of the Gas Committee, the Bingley Improvement Commissioners decided yesterday week that for the next five years the whole of the profits from the gas-works should be set aside either for purposes of renewals, additions to gas plant, or any such other purpose as they may direct; and that the resolution recommending that the price of gas be increased 6d. per 1000 cubic feet should be rescinded. A resolution was then adopted to the effect "that the price of gas be advanced only 4d. per 1000 feet on and after June 22 next until further notice." In answer to questions with respect to the first-named minute, it was stated that the object of the Committee was to provide money in order to meet certain extensive repairs and renewals which the Gas Engineer (Mr. G. D. Malam) thought would be needed during the next four or five years. Small renewals had been made out of profits, but in great part the profits had been devoted to other purposes. It was impossible to repair certain parts of the gas plant year by year, only superficially.

Extensions at the Atherton Gas-Works.—An important extension of the Atherton Local Board's gas-works is to be carried out which will greatly increase the storeage capacity. An inspection of the works was recently made by Mr. Thomas Newbigging, C.E., of Manchester, who reported to the Gas Committee that the consumption in the district was rapidly overtaking the power of production. The Board have therefore considered the advisability of increasing the number of retorts by placing settings of sevens in the ovens instead of settings of fives as at present. The stack now consists of eight single settings of five retorts each, or 40 mouthpieces altogether. By the proposed change, the mouthpieces will be increased to 56, and the production by 40 per cent. The condensing and exhausting plant also need increasing. The storeage is insufficient; the capacity of the two holders being 165,000 cubic feet, which is not equal to one day's production in the depth of winter. It can be increased to 280,000 cubic feet, or upwards of a day-and-a-half's make, by adding another lift to the larger holder; and this will probably be done. Other improvements are contemplated; and the estimated cost is set down at £4000.

Newbury Corporation Gas Supply.—At the last meeting of the Newbury Town Council, the Gas Committee reported that they had had before them the accounts of the gas undertaking for the year ending March 25 last, prepared by Messrs. Alfred Lass and Co.; and although the figures were not so favourable as they had been in previous years, the profits were sufficient to pay the interest and sinking fund, and admit of an addition of £118 to the balance carried forward. Mr. C. Lucas, in moving the adoption of the report, said the profit on the year's working amounted to £1381 13s. 11d., as against £1992 4s. 7d. before, or a difference of £600. Still, they were sufficient for all purposes. The reduced profits were accounted for by the extra cost of coal, and by the fact that the discount system had extended over the whole year, and amounted to £100 more than before. Then the residuals, although a larger quantity was sold, brought in less by £65. The cost of maintaining the public lamps and of purifying materials was also £100 more; and a new governor had cost £100. While the profits did not look so satisfactory, the undertaking was really in no worse position, because the decrease had been accounted for. Mr. Hall seconded the motion, and it was carried.

The Lighting of Courts in Birmingham.—The Public Works Committee of the Birmingham Corporation, it will be recollected, were empowered, in February last, to take steps to secure the lighting of about twenty courts in the city, selected at random from every district. The Committee approached the owners of the property affected, and pointed out the state of the law touching the lighting of the courts. The Town Clerk (Mr. E. O. Smith) had declared that, while the Consolidation Act only authorized the Corporation to compel owners of courts to provide the "means of lighting," and not the light itself, such owners, if they neglected to provide gas as well as gas-lamps, could be required to level, pave, sewer, and carry out other works in their courts. The plain meaning of this declaration has been fully appreciated by the owners already communicated with; and in not one single instance has a property-owner declined to undertake to light his court. It is assumed that the whole of the courts can be dealt with in the same way, without involving any expenditure of the rates; but it has not yet been decided whether the Committee will take a general authority from the Council to deal with all courts and terraces, or bring another batch forward and proceed piecemeal.

The Barnsley Gas Company and their Stokers.—In accordance with the notice given by the stokers employed at the Barnsley Gas-Works, the first gang of workmen ceased operations last Friday morning. The day men were proceeding with their work, and would have finished in the evening, had not an end been put to their engagement shortly after noon, owing to the arrival of new hands, who reached Barnsley by special train, which was stopped at the Old Mill siding, close to the works. The old hands reported that the new comers, 16 in number, were from Penistone; and it was supposed that they had come from the Manchester district. Arrangements have been made to lodge them in the joiners' shop on the works. The Old Mill works are situated just at the boundary of the borough, and a number of policemen were stationed there to prevent any disturbance or interference with the new hands. Mr. M. Hutchins, President of the Gas Workers' Union, arrived in Barnsley last Friday, and at once took steps for convening a public meeting to enlist sympathy with the men who have come out. This was subsequently held under the presidency of Walker, one of the workmen whose discharge has led to the present trouble. The meeting was addressed by Mr. Hutchins; and a resolution was passed promising the support of the public to the men in their "fight for the cause of labour." We learn that all the arrangements made by Messrs. J. and W. W. Hutchinson for supplying the places of the disaffected men have worked satisfactorily. The new hands engaged are all efficient, and everything is going on well. The Union leaders are displaying much vexation at the success of the measures taken in opposition to their tactics.

The Movement for the Abatement of Smoke.—Last Wednesday, a public meeting was held at the Mansion House, to promote the national work undertaken by the Committee for testing smoke-preventing appliances. The Lord Mayor presided. Mr. A. E. Fletcher, Chief Inspector under the Alkali Works Regulation, &c., Act, and Chairman of the Executive of the Committee for Testing Smoke-Preventing Appliances, explained that the Committee did not wish to recommend any particular appliance, nor did they stand forward as inventors. Lord Derby then proposed a resolution approving the objects of the Committee. He said he thought the diminutions of smoke and its necessary accompaniment—dirt—was a matter which concerned everyone, except those who were fortunate enough to live away from great towns. The expenditure of fuel in creating dirt—for that was what it came to—was a waste of fuel itself; and the injury caused to property was not inconsiderable. Possibly more stringent legislation than that which now existed would be needed; but let them first try the experiment of enforcing the laws which they already had. Lord Howard of Glossop seconded, and Professor Chandler Roberts-Austen supported the resolution, which was carried unanimously. On the motion of Sir H. Roscoe, M.P., seconded by Earl Fitzwilliam, and supported by Alderman Bowes (Salford), a resolution was next passed in favour of raising a fund to meet the expenses of the work. Mr. Ernest Hart, the Mayor of Rochdale, and Mr. T. C. Horsfall afterwards addressed the meeting, and a vote of thanks to the Lord Mayor closed the proceedings.

The Bolton Gas Stokers and their Holidays.—The "arbitrary gents" who do themselves the honour of filling official positions in connection with the Gas Workers' Union, are apparently very jealous of their powers and privileges. A week or two ago there appeared in a Bolton newspaper a letter of ten lines, signed "The Men," in which denial was given to the rumour that the stokers employed at the works of the Corporation in Gas Street enjoy, among other privileges, that of three days' annual holiday. In a subsequent issue of the paper, "Henry Higson, Secretary of the Bolton and District Gas Workers' Association," wrote at much greater length to protest against what he considered an interference with his prerogative, and sharply rebuked "the men" for meddling with the matter. He stated that in November last the Gas Committee "very kindly" granted several concessions asked. These did not altogether suit the members of the Association; among them being the three days' holiday in summer, and double pay for New Year's Day was substituted. He contended very properly that when a body of men honourably agree with their master or masters to do a definite quantity of work for a certain amount of money, the agreement ought to be honourably carried out until notice is given by either side to cancel the agreement. He reminded the wavering members of the Association and outsiders that the Secretary alone is authorized to do the correspondence, and that the business is by rule to be transacted by the Secretary and the Committee. Whether or not the rebuke will be lost upon the "wavering members" remains to be seen; but the quarrel though small is not without interest.

The Sutton-in-Ashfield Gas-Works.—A meeting of the Sutton-in-Ashfield Local Board was held last Wednesday evening—Mr. Tudsbury presiding—to consider the question of the plant at the gas-works, and the best means of meeting the anticipated deficit on the current year's operations. Mr. A. H. Bonser (the Chairman of the Gas Committee) said the considerable reduction made in the price of gas some 18 months ago was estimated to cost £700. But economies that were effected reduced it to £461; and it was further reduced by a profit of £150 on the extra gas consumed owing to the reduced price. The increased price of coal, which now averaged 12s. 11½d. against 10s. 7½d. a ton twelve months ago, however, meant that there would be a loss of about £437 at the end of the financial year in March next. The reserve fund had ceased to exist; and the question was whether the Board should raise the price of gas or get the money from the rates, which had previously been relieved to the extent of about £700 out of the profits. Apart from the difficulty of having no working capital (extensions and renewals having all to be paid for out of revenue) their plant was inefficient, and they lost about 1000 cubic feet per ton of coal for want of storeage room. The report of Mr. Chester last year showed that at least £300 could be saved, after repaying the loan, by the erection of a new holder, and another £70 to £100 by improving the purifying plant; and he strongly recommended this to be done. But, of course, it would not meet the difficulty in the current year. The general feeling seemed to be that another holder should be erected, but that before moving in the matter it would be better to wait till they had the exact figures for the past year's working—the deficit in the meanwhile to be met from the rates.

Gas Power *v.* Steam Power for Pumping Purposes.—In the course of an inquiry recently held by Mr. Arnold Taylor, on behalf of the Local Government Board, into an application made by the Uxbridge Local Board for authority to borrow £2000 for the carrying out of alterations to the pumping plant at their water-works, it was stated that the Board had decided to employ gas in place of steam engines, which they believed would result in considerable economy. Tenders were invited; and Mr. Atkinson, representing the British Gas Engine and Engineering Company, was in attendance to afford any explanation that might be required in respect of one submitted by the Company and accepted. The Clerk (Mr. W. Garner) explained that the Board had decided to put into use the "Cycle" gas-engines, two of them to be employed at a cost of £1446, to work day and night, so as to provide a constant supply of water to the district; and, as this would be a permanent charge on the undertaking, they were of opinion that the amount required should be obtained by loan. The Surveyor (Mr. G. Eave) said the cost of the present engines, working 24 hours per day, as now, was £513, and the estimated expense, if they were worked for 24 hours per day all the year round, was £878; whereas the cost of the proposed gas-engines working all day the year through would be £305. A prolonged argument, raised by questions put to Mr. Atkinson, took place on the respective merits of steam and gas engines; but it was stopped by the Inspector, who said he thought the object of the inquiry had been sufficiently gone into. He will report in the usual way; and the only doubtful point is as to whether or not the Local Government Board will sanction the whole of the amount applied for, seeing that the engines are to cost only £1446.

The London Corporation and the Water Companies.—Our readers will remember that some time ago the Corporation of the City of London decided to hold a public inquiry into the question of the water supply and the charges made to the consumers—the expense to be incurred in respect thereof not to exceed £2000. The services of Sir W. Guyer Hunter, M.P., were secured to conduct the investigation, and a preliminary meeting was held in the Guildhall last Friday. The Chairman having invited all who could to give information on the questions before them provided the information was known to them personally, and was not obtained from outside sources, the City Chamberlain (Mr. B. Scott) said his connection with the subject arose under four Acts of Parliament, three of which were passed in 1886, and one in 1888. Neither the Town Clerk nor himself had any knowledge that Parliament was about to insert their names in these Acts, but they were willing to do what they could to carry out the intentions of the Legislature. He had had communications with some of the Water Companies, but he thought it would facilitate the objects of the inquiry, and be more satisfactory to himself, if he were allowed a few days to look up the increased capital of the Companies, the figures being very numerous and somewhat intricate. Sir Guyer Hunter thereupon adjourned the inquiry until the 4th prox.

Rotherham Corporation Gas and Water Supply.—At a recent meeting of the Finance Committee of the Rotherham Corporation, the Borough Accountant (Mr. C. H. Moss) presented his report for the year ending March 25 last. With regard to the Gas Department, in consequence of the gas exhibition—referred to in the JOURNAL for the 6th inst.—having occupied the attention of the Secretary (Mr. T. Bellamy) and the clerks during the past fortnight, the accounts were in a backward state; and therefore Mr. Moss was unable to comment thereon. As to the Water Department, his report stated that, for the first time in the history of the Corporation, the accounts showed a profit; the net surplus after paying all expenses and loan charges, being £302. This good result had been realized in spite of increased expenditure for fuel for the pumping-engines; and the main reason for it was the improvement in income. The amount of rents for domestic supply was about the same as in the previous year; but there was less loss from empty houses, &c., by £140. The sales of water by meter for trade purposes showed an increase of £306; and the districts outside the borough had also taken large supplies of water. The total income of the department for the year was £8582, as against £7990 for the previous year. As to the current year, they had, he said, to look forward to the extraordinary expenditure on the engines and boilers of the central pumping-station, so that there would probably be a deficiency; but after that he saw no reason why the Water Committee should not be in easy circumstances, as he presumed there was now no serious expenditure on capital account in contemplation.

The Thirlmere Water-Works of the Manchester Corporation.—The Thirlmere works are now in full swing in the Lake District; another step towards their completion being effected by the perforation of Moor How. This is the second longest tunnel on the line, being 3040 yards in length. The longest is Dunmail Rise, having a length of 5165 yards. It is expected that the workers in the latter will meet during next week; whilst the third in size, Nab Scar (1419 yards) has been completed for a considerable time. There is still some heavy work to be done in putting down the immense iron pipes through some of the deeper valleys—such as Stock Ghyll, Skelghyll, and Troutbeck. The boring of the tunnel through solid rock, which is to form the outlet from the lake of compensation water into St. John's Beck to the extent of 4,126,425 gallons per day, is in progress. Messrs. Morrison and Mason have pushed forward their work over a length of 13 miles 1233 yards from Thirlmere, the contract for which amounts to £222,287; while work thereon to the extent of £18,471 was previously executed under Messrs. Vernon and Co. This may be considered the most forward towards completion of any of the contracts. The succeeding one, No. 4, originally let to Mr. T. W. Chester, was not so fortunate; and, as our readers are aware, the works have been relet to Messrs. Monk and Newall, of Liverpool, at a trifle over £135,000. The following length of 16 miles 480 yards is in a much more forward condition. The contract for this is £141,813. Messrs. John Aird and Son come next with 14 miles 1404 yards, which leads to the Ribble, and is let at £163,745. Though but sixteen months have elapsed since this contract was let, a considerable amount of work has already been accomplished.

The Local Government Board and the Warrington Improvement Bill.—The report of the Local Government Board on the Warrington Extension, Water, and Improvement Bill, has been received; and, contrary to expectation, it does not offer any formidable opposition to the principal objects of the measure. With respect to the purchase of the water-works, the Board call attention to the fact that the limits of supply of the Company go beyond the boundary of the borough as proposed to be extended. They then say: "It is further to be borne in mind that the purchase is, under the Bill, proposed to be made (in default of agreement) compulsorily upon terms to be fixed, in case of dispute, by arbitration; and that, consequently, neither the Corporation nor the Committee have the same opportunity of estimating the probable financial results of the purchase that they would have if the price of the undertaking had been ascertained. Under these circumstances, it appears to the Board that the Committee should require to be furnished with strong evidence of the advantages likely to result from the acquisition of the undertaking by the Corporation before they authorize its compulsory purchase as proposed by the Bill." The clauses for the compulsory purchase of the water-works have been withdrawn; and the purchase, if effected, will now be carried out by agreement, so that the objection of the Local Government Board will be met. The Board do not take any exception to the clause in the original Bill, providing for the compulsory redemption of gas annuities at 25 years' purchase, but suggest certain alterations in the manner of providing the necessary sinking fund in the event of the Committee all owing the clause. This clause has also been withdrawn and most of the objections contained in the report have already been provided for by alterations since the Bill was first deposited.

The Late Electrical Exhibition at the Bingley Hall, Birmingham.—The exhibition of electrical and other appliances held in the Bingley Hall, Birmingham, last year resulted in a balance to the good of £304, which has been equally divided between three local hospitals—the General, the Jaffary, and the Queen's. In round figures the exhibition cost £11,700, and produced £12,000.

Lead-Poisoning in Sheffield.—In the JOURNAL for the 6th inst., a brief notice was given of an article which had appeared in the *British Medical Journal* on this subject. Dealing further with the matter, our contemporary refers to the decision of the Committee of Inquiry appointed by the Sheffield Corporation, to use calcium carbonate in the form of chalk. The advantages of the use of chalk, it is pointed out, are that it can easily be procured pure and in a state of fine subdivision; while, more important still, as compared with caustic lime, is the fact that any excess in the water remains inactive. As the amount of carbonic acid in the water is very small, there is no solution of the carbonate, irrespective of what is required for neutralizing the acid, so that the hardness of the water is not increased at the most by more than one degree. Within the last few weeks the recommendation of the Committee has been carried into effect by the addition to the water at Redmires of chalk in the form of whiting; chalk having been added also to the water which has already passed from Redmires to the dam at Crookes. Mixed into a sort of cream with water, it has been pumped into the reservoirs, while the water has also been treated in a similar manner in the course of its passage from Redmires to Crookes. The water was somewhat coloured at first; but soon became as clear as when it entered the conduit. It is, perhaps, too early as yet to draw conclusions from the results that have so far been obtained; but there is reason to believe that the experiment may ultimately prove successful, since Professor Dewar has expressed himself as satisfied with the effect produced on the water up to the present time. The further report of the Committee, observes our contemporary, will be looked for with much interest, in order to see what has been the outcome of the experimental treatment of the water now in progress; as if such comparatively simple means are really proved to be of avail, it will save the Corporation the enormous expense that would be incurred in the laying down and periodical renewal of complicated filter-beds.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

For Stock Market Intelligence, see ante, p. 974.

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Pr. con.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Apr.	10½	Alliance & Dublin 10 p. c.	10	17—18	..	5 16 8
100,000	10	,,	7½	Do. 7 p. c.	10	11½—12½	..	5 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	109—111	..	4 10 1
100,000	20	28 Nov.	8	Bahia, Limited	20	20—21	..	7 12 4
200,000	5	15 May	7½	Bombay, Limited	5	7—7⅜	+⅛	5 0 0
40,000	5	,,	7½	Do. New	4	4⅞—5⅛	..	5 17 10
380,000	Stck.	27 Feb.	12½	Brentford Consolidated	100	218—223	..	5 9 10
125,000	,,	,,	9½	Do. New	100	160—165	..	5 12 2
220,000	20	13 Mar.	11	Brighton & Hove Original	20	40—42	..	5 4 9
320,000	20	28 Mar.	11½	British	20	43—45	..	5 0 0
50,000	10	13 Mar.	11	Bromley, Ordinary 10 p. c.	10	18—20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13—14	..	5 14 3
328,750	10	14 Nov.	8½	Buenos Ayres (New) Limited	10	12½—13½	..	5 18 6
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	105—110	..	5 11 1
150,000	20	27 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 4
550,000	Stck.	16 Apr.	13⅜	Commercial, Old Stock	100	249—251	..	5 8 3
130,000	,,	,,	10½	Do. New do.	100	200—205	..	5 4 10
130,000	,,	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	118—123	..	3 13 2
557,320	20	12 Dec.	13	Continental Union, Limited	20	48—50	..	5 4 0
242,680	20	,,	13	Do. New '69 & '72	14	33—35	..	5 4 0
200,000	20	,,	10	Do. 7 p. c. Pref.	20	38—40	..	5 0 0
75,000	Stck.	28 Mar.	10	Crystal Palace District	100	195—205	..	4 17 7
234,060	10	30 Jan.	13	European, Limited	10	27—28	+1⅛	4 12 10
120,000	10	,,	13	Do. New	7½	18½—19½	+½	5 0 0
354,060	10	,,	13	Do. do.	5	13—14	+½	4 12 10
5,470,620	Stck.	13 Feb.	13⅜	Gaslight & Coke, A, Ordinary	100	246—251	..	5 9 6
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	100—103	..	3 17 8
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	253—258	..	3 17 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	121—125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	180—185	..	4 1 1
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	162—166	..	4 4 4
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	253—258	..	3 17 6
1,061,150	,,	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	117—122	..	3 5 7
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	125—130	..	3 9 3
650,000	,,	,,	6	Do. 6 p. c. do.	100	160—170	..	3 10 7
3,800,000	Stck.	15 May	12	Imperial Continental	100	214—218*	..	5 10 1
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	5—5½	..	5 9 1
560,000	100	1 Apr.	5	Met. of Melbourne, 5 p. c. Deb.	100	112—114	..	4 7 9
541,920	20	28 Nov.	6⅓†	Monte Video, Limited	20	20½—21½	+⅛	6 0 11
150,000	5	28 Nov.	10	Oriental, Limited	5	8½—9½	..	5 8 1
60,000	5	28 Mar.	7	Ottoman, Limited	5	5½—6	..	5 16 8
166,870	10	26 July	4	Pará Limited	10	3½—4½	..	8 17 9
				People's Gas of Chicago—				
420,000	100	2 May	6	1st Mtg. Bds.	100	98—102	..	5 17 8
500,000	100	2 Dec.	6	2nd Do.	100	95—100	..	6 0 0
150,000	10	16 Apr.	10	San Paulo, Limited	10	14⅜—15⅜	..	6 9 2
500,000	Stck.	27 Feb.	13⅜	South Metropolitan, A Stock	100	285—295	+5	4 9 10
1,350,000	,,	,,	11⅜	Do. B do.	100	230—235	+2½	4 17 10
141,500	,,	,,	12	Do. C do.	100	245—250	+3	4 16 0
650,000	,,	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	140—145	..	3 9 0
60,000	5	27 Feb.	11½	Tottenham & Edm'nton, Orig.	5	11—13	..	4 8 5
						*Ex.div.		
				WATER COMPANIES.				
728,446	Stck.	30 Dec.	9⅜	Chelsea, Ordinary	100	262—267	..	3 11 2
1,720,560	Stck.	16 Apr.	7⅜	East London, Ordinary	100	213—217	+2	3 9 1
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	144—149	..	3 0 5
700,000	50	12 Dec.	9	Grand Junction	50	124—128	..	3 10 4
708,000	Stck.	13 Feb.	10½	Kent	100	275—280	..	3 15 0
1,043,800	100	30 Dec.	9⅜	Lambeth, 10 p. c. max.	100	255—260	..	3 13 0
406,200	100	,,	7⅜	Do. 7½ p. c. max.	100	200—205	..	3 13 2
200,000	Stck.	28 Mar.	4	Do. 4 p. c. Deb. Stk.	100	122—126	..	3 3 6
500,000	100	13 Feb.	12½	New River, New Shares	100	365—370	..	3 5 6
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk	100	127—130	..	3 1 6
902,300	Stck.	12 Dec.	6	S'thwk & V'xhall, 10 p. c. max.	100	166—170	+1	3 10 7
126,500	100	,,	6	Do. 7½ p. c. do.	100	161—166	+4	3 12 3
1,155,066	Stck	12 Dec.	10	West Middlesex.	100	262—267	..	3 14 10

† Next dividend will be at this rate.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM LONDON."

GWYNNE & CO.,

TELEPHONE No. 2698.

HYDRAULIC AND GAS ENGINEERS, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

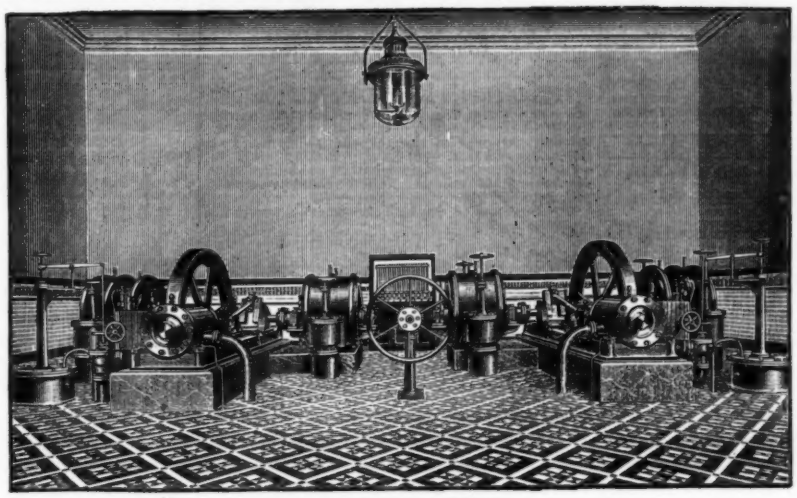
Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co. for Gas Exhausters, &c.

They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality.

The result is that in every instance their work is giving the fullest satisfaction.

They have completed Exhausters to the extent of 23,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work, and can be referred to.

Catalogues and Testimonials on application at the above address.



Only 75 Revolutions per Minute.

The above Engraving shows Two Engines driving Four GWYNNE & CO.'S PATENT NON-FLUCTUATING EXHAUSTERS to pass 200,000 cubic feet per hour (without the slightest oscillation), at the EFFINGHAM STREET GAS-WORKS, SHEFFIELD.

Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

NO OTHER MAKER CAN DO THIS.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAYS.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH.
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.

Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / No. 54, BERNARD STREET, LEITH, } SCOTLAND.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

SULPHURIC ACID, B.O.V., for Sulphate of Ammonia Making. Guaranteed clear, of full strength, and to produce a fine white-coloured salt, Delivered in carboys or railway tank waggons.

For prices and terms address BALE, BAKER, AND CO., 120 & 121, Newgate Street, LONDON.

GAS Authorities requiring Second-hand GAS APPARATUS—Mouthpieces, Hydraulic Mains, Condensers, Purifiers, Exhausters, Station Meters, &c. Also superior quality Gas-Purifying BOG ORE (OXIDE OF IRON). Please address, D. M. NELSON AND SONS, 164, St. Vincent Street, GLASGOW. (Telegraphic Address: "GAS GLASGOW.")

EXTRACT from the Harrogate Gas Company's Report, dated the 5th of February, 1890: Coal consumed, 8600 tons. Gas made, 92,880,000 feet; ditto sold, 84,880,000 feet; ditto unaccounted for, 8,000,000 feet; quantity made per ton, 10,800 feet; ditto sold, 9869 feet. Illuminating Power, 16·1 candles. Coals used, Brancepeth. Owners, Strakers and Love, Newcastle-on-Tyne; who have also Brandon Hutton Seam Unscreened Gas Coal. Analysis, 10,500 cubic feet per ton; Illuminating Power, 16·2 candles.

A Provincial Gas Engineer (an Assoc. M. Inst. C.E.) is prepared to receive an intelligent PUPIL. Premium required.

Apply, by letter, to No. 1810, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

DRAUGHTSMAN and Surveyor, at present at a large Provincial Gas and Water Works desires a similar SITUATION, or as ASSISTANT at a large Works, or MANAGER of a small Works. Ten years at present place. Good references. No objection to going Abroad.

Address No. 1824, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for a large Retort-House, a good FOREMAN STOKER. Must be an experienced man, and able to deal with large bodies of men.

Address, stating all particulars, No. 1825, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.

Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 20, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 1007 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for Wet and Dry Gas-Meters, Station Meters, and Governors, Pressure-Gauges, Street Lamps, and Pillars, &c.
Telegraphic Address: "Braddock, Oldham."

HUTCHINSON BROTHERS, Barnsley, Gas Engineers and Contractors, Makers of Wet and Dry Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Lead Saturators, Tanks, &c., Tools and Sundries.

TAR and Liquor wanted.
BROTHERTON AND CO., Commercial Buildings, LEEDS.

WANTED, an Engagement as Assistant GAS MANAGER. Practical experience in the Manufacture of Gas in all its Branches; also in the Production of Sulphate of Ammonia. First Prize-Medal (Honours Grade) in Gas Manufacture Examination.

Address No. 1815, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GRAVESEND AND MILTON GASLIGHT COMPANY.

THE Directors of the above Company are prepared to receive APPLICATIONS for the post of ENGINEER and SUPERINTENDENT to the Company.

The Salary will be £300 per annum, with a House, Gas, and Coal.

The person appointed must commence his duties on or about the middle of July next.

Full particulars of the duties to be performed can be obtained of me, the undersigned, on request, enclosing a stamped addressed Envelope for reply.

Personal canvas of the Directors is absolutely prohibited.

Applications marked "Engineer," sealed, and addressed to me as below, must reach my Offices by the 3rd of June next at noon.

The return of original testimonials is not guaranteed. Copies may be sent, to be verified when required. In any case the number is not to exceed *three*.

By order,
CHAS. R. GRAMSHAW,
Secretary.

27, King Street, Gravesend.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
120 and 121, NEWGATE STREET, LONDON, E.C.

TUBES.

FOR Gas, Steam, and Water; Galvanized, White Enamelled, and Hydraulic Tubes, &c.
JOHN SPENCER, Globe Tube Works, WEDNESBURY, and 14, Great St. Thomas Apostle, LONDON.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

BENTLEY & CO.

MANCHESTER ELECTRICAL STORES.

FOR Batteries, Bells, Wires, and Special Electrical Apparatus, address the best house
17, NEWTON STREET, PICCADILLY, MANCHESTER.

GAS MANAGER.

THE Bishop's Stortford Gas Company, Limited, are about to appoint a GENERAL MANAGER of their Works. Quantity of coal carbonized, about 2500 tons per annum.

Applications, stating age, qualifications (with two or three testimonials of recent date), and salary required, must be delivered to me on or before the 29th of May inst. By order of the Directors,
WILLIAM GEE, Secretary.

Bishop's Stortford, May 17, 1890.

LYMM LOCAL BOARD.

TO GAS MANAGERS.

THE Local Board of Lymm desire to receive APPLICATIONS for the appointment of a WORKING MANAGER at their Gas-Works, in Lymm, Cheshire.

The Manager will be required to enter upon his duties as soon as he is appointed.

For particulars as to Remuneration, Duties, &c., apply in writing to the Clerk.

Applications, in Candidate's own handwriting, stating age and qualifications, with copies of three recent Testimonials (which will not be returned), must be sent to the undersigned, on or before the 5th day of June next, marked "Application for Gas Manager."

The Board reserve the right of rejecting all or any applications.

W. MULLARD, Clerk to the Board.
Local Board Offices, Lymm,
May 23, 1890.

FOR SALE—One 8-horse power Engine and COAL BREAKER, with top and bottom Elevator, Gear, and Patent Wrought-Iron Chain, with Malleable Iron Buckets complete.

The above Machinery is almost new, having only been in use about Three months.

For further particulars, apply to the COAL DISTILLATION COMPANY—COOPER'S PATENTS—LIMITED, 323 and 323, Winchester House, Old Broad Street, LONDON, E.C.

ISLE OF WIGHT.

MEETING OF THE GAS INSTITUTE.

VENTNOR for pure Sea Air and unequalled lovely Scenery.

APARTMENTS, large and well furnished, facing Sea. Board in own Rooms if desired; or Board and Residence. Every Comfort. Good Cooking. Liberal Table. Moderate Charges.

Address "GILMERTON," Madeira Road, VENTNOR.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.

Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

FOR SALE—One 5000 feet per hour STEAM-JET GAS EXHAUSTER by Körting Bros., with or without 7-inch Bye-Pass Valves and Connections. In good condition. May be seen at the Gas-Works, Barnard Castle.

J. J. BAILEY, Secretary.

FOR SALE—A Kirkham, Hulett, and Chandler's WASHER-SCRUBBER, of a capacity of 300,000 cubic feet per day; also a 12-inch GOVERNOR by Peebles.

Can be seen at work on application to F. C. HUMPHRYS, Gas-Works, ILKESTON.

THE Stourbridge Gas Company have FOR SALE a quantity of RETORT MOUTHPIECES, ASCENSION-PIPES, H-PIPES, HYDRAULIC MAINS, and VALVES. May be bought cheap.

For particulars apply to the MANAGER.

THE Galashiels Gas Company have for SALE Three PURIFIERS, 12 feet square, in good order, which may be seen at the Works.

Any other information may be obtained from Mr. SCOTT, the Manager.

Galashiels, May 10, 1890.

FOR SALE—Seven Purifiers, 15 feet square, with Sieves, Connections, Valves, and Lifting Apparatus complete.

One PURIFIER, 20 ft. by 16 ft., with Sieves, Connections, Valves, and Lifting Apparatus complete.

One SCRUBBER, 20 ft. by 6 ft. diameter.

(The above may now be seen at work.)

Two Wrought-Iron TANKS, 8 feet diameter by 7 feet and 6 feet respectively.

One REID'S GAS WASHER.

Two Cast-Iron TANKS, 15 ft. 8 in. diameter by 11 ft. 4 in. and 8 ft. 6 in. respectively.

Two EXHAUSTERS (Jones), equal to 25,000 cubic feet per hour.

A number of 15-inch and other VALVES.

A quantity of SHAFTING and PULLEYS.

J. HEPWORTH.

Gas-Works, Carlisle, April 28, 1890.

LITTLEHAMPTON GAS COMPANY, LIMITED.

FOR SALE—In consequence of removal to new Works—

One Single Gasholder and Cast-Iron Tank, 40 feet diameter, 13 ft. 6 in. deep; capacity 14,000 feet.

Four Purifiers, 7 ft. 6 in. by 5 ft. 6 in. by 3 ft., with 6-inch Centre-Valve complete.

Scrubber, 15 ft. by 3 ft. 6 in. diameter, fitted with Boards and Distributor.

One Livesey's Patent Washer; capacity, 100,000 feet per day; 6-inch Connections, and 6-inch Four-Way Valve.

Condenser, 6-inch Pipes, 20 feet high, with Tar-Box and Tar-Wells complete.

Hydraulic Main, with Ascension and Bridge Pipes, and 23 Mouthpieces complete.

One 3-inch Liquor Pump, with Spur and Driving Wheels and Shafting complete.

One 6-inch Bye-Pass Valve.

One Donkey-Feed Pump, and one 6-inch Four-Way Valve.

The above Plant may be viewed by arrangement with Mr. W. Waite, Manager of the Works.

Tenders to be forwarded to the Chairman, Captain E. H. Hills, R.N., High Street, Littlehampton.

The Directors do not bind themselves to accept the highest or any tender.

ARTHUR SNEWIN, Secretary.

May 17, 1890.

THE Clevedon Gas Company are desirous of CONTRACTING for 3000 tons of GAS COAL and 2000 tons of HOUSE COAL, to be delivered during the next Twelve months.

Sealed tenders to be sent to the Chairman of the Company not later than Thursday, June 5, 1890.

For particulars apply to Mr. S. DAWES, Gas-Works, CLEVEDON.

TENDERS FOR TAR.

THE Clevedon Gas Company will be glad to receive TENDERS for their surplus TAR for One or Two years, to be delivered into Buyer's Tank Wagons, or Casks, at the Clevedon Railway Station.

Sealed Tenders to be sent to the Chairman of the Company by Thursday, June 5, 1890.

Any further particulars can be had of Mr. SAMUEL DAWES, Manager.

PETERBOROUGH GAS COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of best screened GAS COAL and NUTS, for One or Two years, commencing the 1st of July next.

Form of tender and conditions may be obtained on application to the undersigned.

Tenders to be sent in by the 9th of June, 1890, endorsed "Coal," and addressed to the Chairman of the Company.

The Directors do not bind themselves to accept the lowest or any tender.

JOHN BARTON,
Secretary and Manager.

Gas-Works, New Road,
Peterborough, May 17, 1890.

EASTBOURNE GAS COMPANY.

TENDERS FOR COAL.

THE Directors of the Eastbourne Gas Company invite TENDERS for the supply of 18,000 tons of best GAS COAL, to be delivered within One year from the 1st of July next.

Particulars and form of contract may be obtained from the undersigned; and sealed tenders, endorsed "Tender for Coal," must be sent in not later than Friday, the 30th inst.

J. H. CAMPION COLES,
Secretary.

May 14, 1890

THE Directors of the Dronfield Gaslight and Coke Company are prepared to receive TENDERS for the supply of GAS COAL (not exceeding 600 tons) required at their Works during the Year ending June 30, 1891.

Particulars and forms of tender may be obtained from the undersigned, to whom tenders should be sent not later than May 31.

The Directors do not bind themselves to accept the lowest or any tender.

C. THORPE, Secretary.

Chesterfield.

TENDERS FOR GAS COAL.

THE Directors of the Maidstone Gas Company are prepared to receive TENDERS for the supply and delivery of 15,000 tons of GAS COAL during a period of One year, commencing the 1st of July next.

Particulars and forms of tender may be obtained from the undersigned.

Tenders, endorsed "Tender for Coal," to be addressed to the Chairman, and delivered not later than Ten a.m. on Thursday, the 29th inst.

H. SMYTHE, Engineer and Manager.

Gas-Works, Maidstone, May 1, 1890.

BOROUGH OF MOSSLEY.

TENDERS FOR COAL AND CANNEL.

THE Gas Committee are prepared to receive TENDERS for the supply of about 7500 tons of COAL and 1000 tons of CANNEL.

Specifications and forms of tender can be obtained from Mr. Richard Merrell, Manager at the Works.

Tenders to be sent to the undersigned not later than the 7th of June next, endorsed "Tender for Coal" or "Cannel."

JOSEPH HYDE, Town Clerk.

Mossley, May 16, 1890.

TENDERS FOR CANNEL.

THE Gas Committee of the Corporation of the Borough of Bury are prepared to receive TENDERS for the supply of CANNEL for the next Twelve months, from Aug. 1, 1890.

Tenders, sealed and marked outside "Tender for Cannel," to be sent to J. Haslam, Esq., Town Clerk, Bury, on or before Saturday, June 21.

Particulars as to quantity and conditions of contract may be had on application to the undersigned.

W. H. S. GENDALL, Manager.

Gas Office, Elton, Bury.

CAMBRIDGE UNIVERSITY AND TOWN GAS-LIGHT COMPANY.

TO TAR DISTILLERS AND OTHERS.

THE Directors of this Company will, at their Meeting on June 19, be prepared to receive TENDERS for the surplus TAR and the whole of the AMMONIACAL LIQUOR produced at these Works for a period of One year, from July 1 next ensuing.

Further particulars may be had from the undersigned.

WILLIAM DUESBURY, Manager.

Gas-Works, Cambridge, May 22, 1890.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

RESIDUAL PRODUCTS FOR SALE.

THE Gas Committee are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR produced at their Works for a period of One, Two, or Three years, commencing on the 1st of July next.

Tenders to state the price per ton for tar, and price per ton for liquor 6° Twaddel.

Tenders to be delivered, addressed to the Chairman of the Gas Committee, on or before June 12, 1890, endorsed "Tender for Tar, &c."

Particulars as to quantity and conditions of contract may be obtained on application to the Engineer.

The Committee do not bind themselves to accept the highest or any tender.

JAMES JACQUES,
Engineer and Manager.

Gas-Works, May 16, 1890.

TENDERS FOR GAS COAL.

THE Directors of the Gloucester Gaslight Company invite TENDERS for the supply of about 7000 tons of GAS COAL for One year, from the 1st day of July next, in such monthly quantities as may be required by the Company.

Tenders to state the price delivered at the Midland Railway Wharf, High Orchard, or the Great Western Railway Wharf, Llanthony, Gloucester; or if sent (as preferred) by Water, the price delivered both in Vessel and at the Gas Company's Wharf, on the Gloucester and Berkeley Canal.

Further particulars may be obtained of the Company's Engineer, Mr. R. Morland.

Sealed tenders, endorsed "Tender for Coal," specifying the description and quality of the Coal, to be addressed to the Chairman, Gas Offices, The Quay, Gloucester, and delivered not later than Monday, the 2nd day of June next.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any tender.

By order,
WILLIAM E. VINSON, Secretary.

Gas Offices, Gloucester, May 1, 1890.

BOROUGH OF ST. HELENS.
(GAS DEPARTMENT.)

TO TAR DISTILLERS.

THE Gas Committee of the St. Helens Corporation invite TENDERS for the purchase of the surplus TAR produced at their Works.

Estimated quantity about 1100 tons.

Forms of tender and all particulars may be obtained on application to the undersigned.

The tenders, properly endorsed, are to be delivered on or before the 10th of June next, addressed to the Chairman of the Gas Committee, Warrington Old Road, St. Helens.

SAMUEL GLOVER,
Engineer and Manager.

Gas-Works, Warrington Old Road,
May 19, 1890.

TENDERS FOR SUPPLY OF GAS COAL.

THE Widnes Local Board invite Tenders for the supply of about 12,000 tons of GAS COAL (Slack, "Through and Through," or Screened Coal) to be delivered at the Gas-Works, Widnes.

Conditions and forms of tender may be obtained from Mr. Carr, Gas Engineer, Widnes.

Tenders to be addressed to the Chairman of the Gas Committee, endorsed "Gas Coal," and delivered to the undersigned not later than Eleven a.m., on Tuesday, the 10th of June.

The Board do not bind themselves to accept the lowest or any tender.

JAS. T. ALLEN, Clerk.

Town Hall, Widnes, May 19, 1890.

BUXTON LOCAL BOARD.

CONTRACT FOR COAL.

THE Gas Committee invite Tenders for the supply of good GAS COAL for One year, at the rate of about 1400 tons per annum, to be delivered at their Siding (on the Midland Railway) in Ashwood Dale, Buxton.

Tenders, endorsed "Tender for Gas Coal," addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, not later than Noon on the 31st of May.

Forms of tender and other particulars may be obtained of Mr. George Smedley, Gas Department, Town Hall, Buxton.

The Board do not bind themselves to accept the lowest or any tender.

By order,
JOSIAH TAYLOR, Clerk to the Board.

Buxton, May 12, 1890.

MANCHESTER CORPORATION GAS-WORKS.

SPENT OXIDE

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the purchase and removal of the SPENT OXIDE to be produced at their Gaythorn, Rochdale Road, and Bradford Road Works during a period of One, Two, or Three Years from the 30th of June next.

The Committee do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Spent Oxide," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 5th day of June next.

Forms of tender and further particulars may be obtained on application, in writing, to Mr. Charles Nickson, Superintendent of the Gas Department.

By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.

Town Hall, May 9, 1890.

MANCHESTER CORPORATION GAS-WORKS.

TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the Manchester Corporation are prepared to receive TENDERS for the purchase and removal of the TAR and AMMONIACAL LIQUOR to be produced at their Droylsden Station during a period of One or more years from the 24th of June next.

The Committee do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Tar and Liquor, Droylsden," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 5th day of June next.

Forms of tender and further particulars may be obtained on application, in writing, to Mr. Charles Nickson, Superintendent of the Gas Department.

By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.

Town Hall, May 9, 1890.

TENDERS FOR GAS COAL.

THE Goole and District Gas and Water Company are prepared to receive TENDERS for the supply, at the Company's option, of from 3000 to 4000 tons (of 21 cwt. per ton) of best screened, hand-picked Gas Coal, free from Dirt, Shale, Pyrites or other Impurities, during a period of Nine or Twelve months, from July 1 next, at the like option, and in such quantities as may from time to time be required during the period agreed upon.

Tenders to state the price per ton delivered alongside the Aire and Calder Canal Basin at Goole, or in Trucks at the Bridge Street Siding of the Lancashire and Yorkshire Railway at Goole.

Sealed tenders, endorsed "Tender for Coal," specifying description and quality, to be addressed to me at the Gas Offices, Goole, and delivered not later than Wednesday, the 11th of June next.

Terms of Contract can ascertained of the Manager at the Works, or at the Company's Offices.

The Directors do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to accept the whole or any portion of the quantity offered.

By order of the Directors,
GEO. ENGLAND,
Secretary to the Company.

Burlington Crescent, Goole.
May 22, 1890.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Tonbridge Gas Company are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR, which may be produced at their Works, Tonbridge, during One year, commencing on the 1st of July next, and terminating on the 30th of June, 1891.

The strength of the Liquor to be tested by Twaddell's Hydrometer, and tenders to state the price per 1000 gallons, to be paid for every ½° of strength from 4.

Further particulars may be obtained of the undersigned, to whom tenders, sealed, and endorsed "Tender for Tar and Liquor," must be delivered not later than the 16th day of June next.

The Directors do not bind themselves to accept the highest or any tender.

By order,
THOS WILTON, Secretary.

Gas Office, 73, High Street, Tonbridge.

MANUFACTURE AND SUPPLY OF GAS AT SANDHURST.

THE Secretary of State for War is prepared to receive TENDERS for the Manufacture and supply of GAS at Sandhurst, during a period of Six years, from the 1st of August, 1890.

The existing Gas-Works at Sandhurst may be inspected, and printed forms of tender, and any further information obtained, on application to the Assistant Adjutant General, Aldershot.

The Tenders are to be delivered at the Head Quarter Office, South Camp, Aldershot, by Twelve o'clock Noon, on Friday, the 6th day of June, 1890, addressed to the General Officer Commanding, and marked on the outside "Tender for Manufacture of Gas."

EVAN COLVILLE NEPEAN,
Director of Army Contracts.

War Office, Pall Mall, S.W.,
May 19, 1890.

CORPORATION OF LANCASTER.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas Committee are prepared to receive TENDERS for the supply of about 8000 tons of GAS COAL per annum, delivered on the Gas-Works Siding, Lancaster, in such quantities and at such times as may be required, during a period of One, Two, or Three years, commencing delivery in August next.

Sealed tenders, endorsed "Gas Coal," giving full particulars of the Coal offered, must be sent to Thomas Swainson, Esq., Town Clerk, Lancaster, on or before the 12th day of June next.

Forms of tender may be obtained on application to the undersigned.

The lowest or any tender not necessarily accepted.

C. ARMITAGE.

Gas-Works, Lancaster, May 19, 1890.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Brighouse Local Board are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works for a term of One, Two, or Three years, from the 1st of July next.

The quantity of Tar made is about 350 tons per annum.

The Tar can be loaded into Contractor's Carts on the Works, or into Barges on the Aire and Calder Canal (which runs alongside) by pipe direct from the Works.

Any further particulars can be obtained on application to the undersigned.

Sealed Tenders, endorsed on the outside "Tender for Tar," stating price per ton at the Gas-Works, must be sent in on or before Thursday, the 5th day of June, 1890, addressed to Richard Kershaw, Esq., Chairman of the Local Board, Public Offices, Brighouse.

The Board do not bind themselves to accept the highest or any tender.

By order,
JAMES PARKINSON, Manager.

Brighouse, May 20, 1890.

TAUNTON GASLIGHT AND COKE COMPANY.

TENDER FOR TAR.

THE Taunton Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Works over One year, commencing the 1st of July next.

Tenders, stating price offered per ton, put into Contractor's Tanks at Taunton Railway Station, to be delivered to the undersigned not later than the 1st of June next.

ALFRED EDWARDS,
Secretary and Manager.

TO CONTRACTORS.

THE Market Harborough Gas Company invite TENDERS for—

2000 tons of screened GAS COAL.
100 tons of LIME.
26 tons of SULPHURIC ACID.

Also 900 yards of 6-inch PIPES (weight per Pipe 2 cwt. 1 qr. 14 lbs.) in 9-feet lengths; 1000 yards of 4-inch PIPES (weight per Pipe 1 cwt. 1 qr. 14 lbs.) in 9-feet lengths; 3033 yards of 3-inch PIPES (weight per Pipe 3 qrs. 18 lbs) in 9-feet lengths. All Pipes to be turned and bored with recess in front for lead, and to be cast in dry-sand moulds, set vertically, and tested before leaving the Contractor's Yard. Also the necessary SPECIALS.

Further information as to the above may be obtained of Mr. Armitage, Manager.

Sealed tenders, giving price per ton at Market Harborough Station, to be endorsed "Tender," and sent to Mr. T. J. Smith, Chairman of the Company, before the 6th of June next.

The Company do not pledge themselves to accept the lowest or any tender.

C. BURGOINE, Secretary.

May 24, 1890.

TENDERS FOR GAS COAL.

THE Directors of the Bath Gaslight and Coke Company invite TENDERS for the supply of about 36,000 tons of GAS COAL, screened or unscreened, upon Contracts of 3000 tons, or multiples of that quantity, during the year commencing the 1st of July next.

The Directors undertake to purchase from each party whose tender is accepted a total quantity of at least 3000 tons, but do not bind themselves to accept the lowest or any tender.

Full particulars and form of tender may be obtained on application to Mr. C. S. Ellery, the Company's Engineer.

Tenders, endorsed "Tender for Gas Coal," to be sent in, addressed to the undersigned, not later than Twelve o'clock (noon) on Monday, the 2nd day of June next.

GEORGE HELPS, Secretary.

Gas Company's Offices, Bath, May 21, 1890.

LLANDUDNO IMPROVEMENT ACTS AND THE PUBLIC HEALTH ACT, 1875.

TENDERS FOR GAS COAL.

THE Llandudno Improvement Commissioners invite TENDERS as follows—viz., For a quantity not exceeding 2500 tons of COAL, capable of producing a minimum of 10,000 cubic feet of 17-Candle Gas per ton.

Delivery between the 1st of July, 1890, and the 30th of June, 1891, at the Llandudno Station of the London and North Western Railway, carriage paid, in such quantities and at such periods as may be ordered from time to time.

Sealed tenders, endorsed "Tender for Coal," to be sent to the undersigned not later than the Morning Postal Delivery of Saturday, the 7th of June next.

The Commissioners do not bind themselves to accept the lowest or any tender.

T. T. MARKS, C.E.,
Engineer and Clerk to the Commissioners.

Commissioners' Office, Llandudno,
May 22, 1890.

BOROUGH OF MACCLESFIELD.

THE Gas Committee are prepared to receive TENDERS for the supply of the undermentioned MATERIALS required during a period of Twelve months, commencing the 1st of July, 1890, viz.:—

1. Wrought-Iron Lap-Welded Steam Tubes and Fittings.
2. The best hand-picked Buxton Lime, delivered fresh at Macclesfield, free from Dirt and Ashes, in such quantities as may be ordered.
3. Cast-Iron Mains and Irregulars.

Forms of tenders, &c., may be obtained on application to Mr. Moore, Engineer, Gas-Works.

Sealed tenders, properly endorsed, to be addressed to the Chairman, Gas Committee, Town Hall, Macclesfield, and to be sent in not later than Saturday, the 7th of June, 1890.

The Committee do not pledge themselves to accept the lowest or any tender.

(Signed) W. FREDK. TAYLOR, Town Clerk.

May 20, 1890.

CONTRACT FOR COAL AND FREIGHT, AND COAL AND FREIGHT SEPARATELY.

THE Broadstairs Gas Company invite TENDERS for the supply of about 2000 tons of best NEWCASTLE GAS COAL.

The Coal is to be fresh wrought, and free from Scale, Sulphurous Pyrites, or other objectionable Matter, and to be delivered in good condition into Carts at the Harbour, or free on rail, at the Station, Broadstairs.

The Company pay the 1s. 6d. per ton Harbour Dues, or 1s. Town Dues if delivered at the Station; all other Dues to be paid by the Contractor.

The first cargo to be delivered not later than July 15, 1890, and to terminate in July, 1891, or thereabout; the cargoes to be delivered at such times as the Directors may require them.

The coal to be weighed on the Company's Weighbridge.

Tenders must be accompanied by an Analysis of the coal offered.

Further particulars can be obtained of the undersigned.

Sealed tenders, endorsed "Tender for Coals" or "Freight," must be sent, directed to the Chairman, on or before Monday, the 2nd day of June next.

The Directors do not bind themselves to accept the lowest or any tender.

By order, W. J. LATCHFORD, Secretary.

Gas Offices, Broadstairs, May 17, 1890.

THE GAS INSTITUTE.

NOTICE is hereby given that the Annual GENERAL MEETING of the INSTITUTE will be held at the Town Hall, in Ryde, in the County of Southampton, on TUESDAY, the 17th DAY of JUNE, 1890, at ELEVEN O'CLOCK in the FORENOON, to transact the Ordinary Business of the Institute.

AND NOTICE IS HEREBY FURTHER GIVEN that, upon the conclusion of the Ordinary Business, an EXTRAORDINARY GENERAL MEETING of the INSTITUTE will be held at the same place, for the purpose of considering, and, if approved, adopting Resolutions, which will then be submitted to the Members, for the purpose of carrying into effect a proposal that application be made to the Board of Trade for a License to enable the Institute to be incorporated as a Limited Company under Section 23 of the Companies' Act, 1867, with a Memorandum and Articles of Association in a form of which a print has been sent to each Member of the Institute, or can be seen on application to the Secretary, at the Office of the Institute, 3 Victoria Street, Westminster, S.W., or at the Office of the Solicitors of the Institute, Messrs. Radcliffes and Cator, 20 Craven Street, Charing Cross, W.C.; and that the Institute be incorporated accordingly; and that such Memorandum and Articles of Association be substituted for the existing Rules of the Institute.

Dated this 16th day of May 1890.

By order,
W. H. HARVEY, Secretary.

C. & W. WALKER.

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ROCHESTER, CHATHAM, AND STROOD GAS-LIGHT COMPANY.

SUPPLY OF COALS.

THE Directors of the above Company invite TENDERS for the supply of 34,800 tons of GAS COALS, to be delivered in the Year commencing the 1st of July next, and ending the 30th of June, 1891.

Particulars and copy of form of contract may be had on application to

WILLIAM SYMS,
Secretary and Manager.

Gas Office, 58, High Street, Rochester,
June 25, 1890.

EAST LONDON WATER-WORKS COMPANY.

ISSUE OF NEW CAPITAL.

NOTICE is hereby given that the Directors are prepared to receive TENDERS for £50,000 being the Fourth Portion of the NEW PERPETUAL DEBENTURE STOCK of the Company, to bear Interest at 4½ per cent. per Annum, free of Income-Tax; such Tenders to be delivered at the Company's Offices, St Helen's Place, in the City of London, not later than Twelve o'clock noon, on the 17th day of June, 1890, and payment of accepted Tenders made on the 30th of June.

Particulars and conditions, together with form of tender, may be obtained at the said Offices, or will be forwarded on application.

By order of the Court of Directors,
ISAAC ADOLPHUS CROOKENDEN,
Secretary.

St. Helen's Place, London, E.C.,
May 20, 1890.

Price 2s. per dozen, or 10s 6d. per 100, post free.

CONSPIRACY and Protection of Property Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

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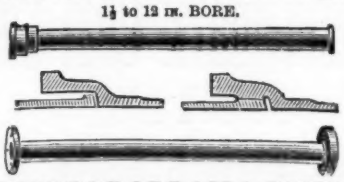


THOMAS ALLAN & SONS,

Bon Lea Foundry,

SOUTH STOCKTON-ON-TEES.

ALSO MANUFACTURERS OF

SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES And GENERAL CASTINGS.

GLASGOW OFFICE: 24, GEORGE SQUARE.

Telegrams:

"BONLEA, STOCKTON-ON-TEES."

"SPRINGBANK, GLASGOW."

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE

BOGHEAD ✣ CANNEL.

Yield of Gas per ton	13,155 cub. ft
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP ✣ GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

For Prices and complete Analysis, apply to

YOUNG, DANCE, & CO.,

COAL OWNERS, NEWCASTLE-ON-TYNE,

Or E. FOSTER & CO. 21, John St., Adelphi, LONDON, W.C.

The GRANTHAM CRANK & IRON Co., Ld.,

Manufacturers of

VERTICAL, — PORTABLE, — CORNISH AND LANCASHIRE

BOILERS.

GRANTHAM.

Send for List 166.

Liberal Terms TO **Shippers and the Trade.**

THE ÉTOILE GAS-LAMP COMPANY,

Gas Lighting and Ventilating Engineers, Brass and Iron Founders, and General Metal Spinners.

124 and 126, PRINCESS STREET, MANCHESTER.

PRICE LIST ON APPLICATION.

SPENT LIMES NO LONGER WASTE PRODUCTS.

Under G. R. HISLOP'S PATENTS

All Spent Limes are most effectually, economically, and continuously recovered, and at from one-third to one-half the cost of New Lime. The results are a surprise to all who have inspected the process, and are entirely satisfactory to all now using it. Descriptive Pamphlet and Terms from Agents as under.

— REGENERATIVE SETTINGS OF RETORTS. —

Hislop's Patent Producer and Patent Charging Appliances offer advantages which are unapproachable, while in every other detail his Settings are confidently recommended as being the most inexpensive and effective possible.

Illustrated Pamphlet and Terms on application to J. E. FISHER, Stourbridge, Agent for England and Wales; to C. M. HAMILTON, Portland Place, Hamilton, Agent for Scotland and Ireland; and for all other Countries to the Patentee,

Geo. R. HISLOP, Gas Engineer, PAISLEY, N.B.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

THOMAS ILLINGWORTH,
NORTH DEAN CHEMICAL WORKS,
Near HALIFAX,
MANUFACTURER OF SULPHURIC ACID
OF EXTRA QUALITY FOR MAKING
WHITE SULPHATE OF AMMONIA.

TAR, LIQUOR, AND SPENT OXIDE
Purchased for Cash against Delivery.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter; and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE. — Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

GAS COAL.
POPE & PEARSON, LTD.,
have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields in practical working over 10,000 cubic feet of gas, with an illuminating power of 16 candles; or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12¼ cwt. of good coke.

This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

CAST-IRON PIPES
FOR GAS AND WATER.
VALVES
FOR GAS, WATER, AND STEAM.

TELEGRAMS: "PIPES GLASGOW."
WM. MACLEOD & CO.,
56, ROBERTSON STREET, GLASGOW.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY,
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

Lanemark Coal Co.,
LIMITED.
LANEMARK CANNEL
AND GAS COALS.

Quotations and Analysis on application to
LANEMARK COLLIERY,
NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

RED OXIDE OF IRON PAINT.

THE BEST KNOWN PRESERVATIVE FOR IRONWORK.

Sold in large quantities on better terms than can be obtained from any other manufacturer.

Also sold in powder in 1 cwt. kegs, at 7/6 per cwt.

In oil as a paste ready for mixing, at 25/- per cwt.

As a paint ready mixed for use, at 3/9 per gallon, in 5 gallon cans, or in packages to suit buyers.

INQUIRIES SOLICITED.

Boiler Incrustation Prevented
BY USING

Used at the following Gas-Works:—Ascot, Birmingham, Broadstairs, Bromsgrove, Hendon, Leven, N.B., Pembroke, Seaham Harbour, Stamford, Warwick, &c., &c.; and by leading Engineers throughout the country.

Absolutely harmless, and the most economical means of preventing Incrustation obtainable.

TESTIMONIALS ON APPLICATION.

ADOLPHE CROSBIE, Walsall Street Chemical Works, WOLVERHAMPTON.

SIXTY PER CENT. ECONOMY IN GAS LIGHTING.
The Schülke Regenerative Lamp

FOR
DOMESTIC AND EXTERNAL LIGHTING.

The only Regenerative Lamp employing the Common Flat-Flame Burners.

Lamps giving 20-Candle power consume less than four feet of Gas per hour.

PURE WHITE & PERFECTLY STEADY LIGHT,
NOT AFFECTED BY DRAUGHTS.

Suitable for any existing fittings (Brackets or Suspending).
Can be fixed in a few minutes.

May be seen at the Offices of the
SCHÜLKE GAS-LAMP Co.
LIMITED,
Room 446—11, QUEEN VICTORIA STREET,
LONDON, E.C.,
Where Price Lists and full particulars may be obtained.

WATER GAS FUEL GAS

FOR INDUSTRIAL PURPOSES,

GENERATED FROM

BITUMINOUS SLACK COAL

BY THE

LOOMIS PROCESS.

The most Economical Gas-Generating System in the World.

Process and Apparatus patented in all Countries.

Many industrial Works in America are successfully using this Process in the manufacture of Steel, Pipes, Saws, Files, Cutlery, Watches, Pottery, Tiles, &c.

A Plant has been put into operation at the Works of Messrs. Thos. Firth and Sons, Limited, Sheffield; and they have decided to enlarge it. Other Plants are being erected in Great Britain and on the Continent.

For particulars apply to

NEWTON, CHAMBERS, & Co., Limited,
THORNCLIFFE IRON-WORKS,
Near SHEFFIELD.

RETORT SETTINGS IMPROVED

BY ADOPTING

THE "NUGENT" & "ROBUS" SETTINGS.

ECONOMY WITH DURABILITY GUARANTEED.

HUNDREDS OF SETTINGS WORKING EMINENTLY SATISFACTORY.

Estimates and Particulars for every Description of Retort Extensions and other Work.

J. & H. ROBUS,

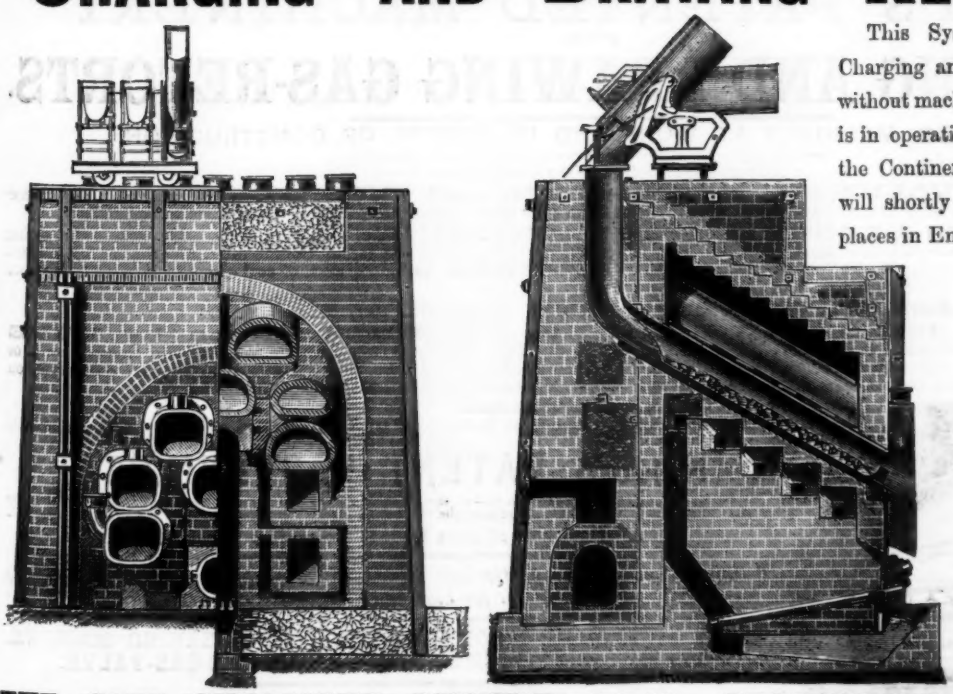
CONTRACTORS FOR GAS AND WATER WORKS,

20, BUCKLERSBURY, LONDON, E.C.

COZE'S AUTOMATIC SYSTEM

OF

CHARGING AND DRAWING RETORTS.



This System of Automatically Charging and Discharging Retorts, without machinery or arduous labour, is in operation at several places on the Continent and in America, and will shortly be at work in various places in England.

All information as to advantages, cost, royalties, &c., can be obtained from the undersigned.

The System is fully patented, and any infringer will be strictly proceeded against.

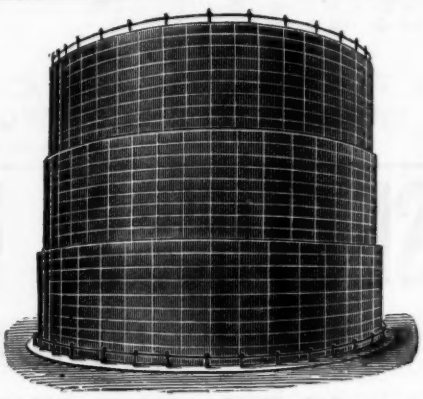
GOLD MEDAL,
Paris Exhibition, 1889.

THE COZE SYNDICATE, LIMITED, 86-88A, LEADENHALL STREET, E.C.

REVOLUTION
IN GASHOLDER CONSTRUCTION.
(GADD & MASON'S PATENTS.)

IMMENSE SAVING IN COST.
NO COLUMNS. NO FRAMING.
NO PIERS ROUND TANK.
GREATER STABILITY.
TILTING IMPOSSIBLE.

Tank Construction rendered simpler and very much cheaper; the Piers and heavy Base Stones being dispensed with.



In Holders for Export a very large additional saving is effected in Carriage, Freight, Transport and Insurance; the Weight being reduced nearly 50 PER CENT.

Engineers intending to extend their Gas Storeage should not fail to see the Two-Lift Holder erected for the Northwich Gas Company.

ADMITTED BY EMINENT ENGINEERS TO BE THE SYSTEM OF THE FUTURE.

Telegrams: "SPIRAL MANCHESTER."

THE PATENT GASHOLDER SYNDICATE,
504, STOCKPORT ROAD, MANCHESTER.

WEST'S GAS IMPROVEMENT Co., Ltd.,
Engineers, Ironfounders, & Contractors,
ALBION IRON-WORKS, MILES PLATTING, MANCHESTER,
MANUFACTURERS OF
WEST'S PATENTED MACHINERY
FOR
CHARGING AND DRAWING GAS-RETORTS.

OVER **160** MACHINES AT WORK AND IN COURSE OF CONSTRUCTION.

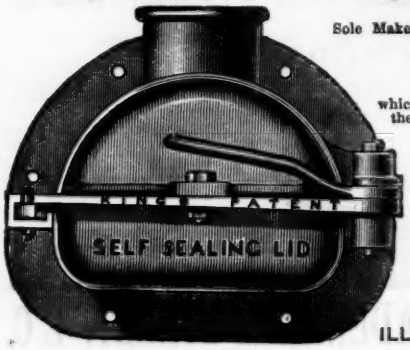
Advantages attending its use are:—

INCREASED VOLUME of GAS per TON, and INCREASED YIELD per Retort.—The system of breaking and distributing the coals in an even layer in the retorts effecting more perfect carbonization.

REDUCTION in LABOUR and COST of WORKING.—In Works where this System of charging and drawing Retorts is adopted, there has been effected a substantial saving in the cost of Gas Manufacture in the Retort-House; the amount saved varying in different Gas-Works from **8 PENCE** to **15 PENCE per Ton** of coal carbonized. Full particulars will be forwarded upon application to W. G. I. Company, Limited.

MANUAL CHARGING AND DRAWING MACHINES.

POWER CHARGING AND DRAWING MACHINES, driven by WIRE ROPE, STEAM, or COMPRESSED AIR.—The power machines are applicable to circular, oval, or Ω-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made. They are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.



Sole Makers of **Circular, Oval,** or Ω-shaped **Mouthpieces,** with Morton's Self-Sealing Lids fitted with

KING'S PATENT FASTENINGS,

which, by a simple wedging action at each end of the crossbar, secure a very tight joint; and at the same time, by their long sliding motion, they effectually remove the tar or other matter from the surfaces of the mouthpiece and lid.

N.B.—The whole of these Fittings are made of Wrought Iron.

Estimates and further particulars forwarded upon application for Mouthpieces complete, or for Lids and Fastenings separately.

Makers of THOMAS & SOMERVILLE'S COKE-BREAKING MACHINE.
Sole Makers of WHITE'S PATENT AUTOMATIC GAS-VALVE.

Mr. JOHN WEST, M. Inst. C.E., Managing Director.

ILLUSTRATED CATALOGUE SENT UPON APPLICATION.

JAMES D. PERKINS. F. SEAVERNS.

PERKINS & Co.,

228 & 229, PRODUCE EXCHANGE, NEW YORK.

Cable Address: "PERKINS, NEW YORK." *Post Office Box 3695, New York.*

SOLE AGENTS FOR THE CELEBRATED

BRECKENRIDGE CANNEL

AND THE

OLD KENTUCKY BOGHEAD

OF KENTUCKY, U.S.A.

These Cannels will rank with the Australian Shale for Gas Manufacture.

Also General Sales Agents for

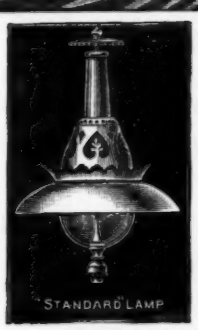
PENNSYLVANIA & VIRGINIA GAS COALS, & AMERICAN FOUNDRY & FURNACE COKE.

Delivery Prices made to any Port in

GREAT BRITAIN,
ON THE CONTINENT,
OR SOUTH AMERICA.

Full Information furnished upon Application to the above Address.

"LIGHT, Wenham Gas Lamps MORE LIGHT."



ITS ADVANTAGES ARE:

IMMENSE ECONOMY IN THE CONSUMPTION OF GAS.

INTENSITY, PURITY, AND STEADINESS OF THE LIGHT.

Absence of Downward Shadow. *Practical Completeness of Combustion.*

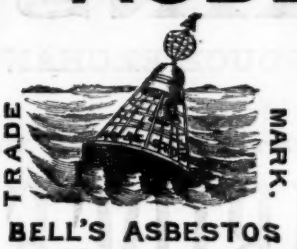
CAN BE FITTED TO ORDINARY SUPPLY-PIPES WITHOUT ALTERATION.

CAN BE USED AS VENTILATING LIGHTS, whereby the products are removed, and damage to decorations, &c., prevented.

SOLE PROPRIETORS AND MANUFACTURERS: **THE WENHAM COMPANY, LIMITED.**

Birmingham Branch: 181, CORPORATION STREET. Works: UPPER OGLE ST., LONDON, W. Manchester Branch: 5, DEANSGATE.

BELL'S ASBESTOS AQUOL PAINT



IS MADE READY FOR USE.

IS FIRE RESISTING.
IS WASHABLE.
IS NON-POISONOUS.
IS MANUFACTURED IN ALL USEFUL COLOURS.
IS IMPERVIOUS TO HEAT, COLD, OR WATER.
IS WITHOUT SMELL.

No expensive Oil or Turpentine required.

WILL NEVER BLISTER.

HAS A COVERING CAPACITY **40** PER CENT. GREATER THAN LEAD PAINTS.

For Outside or Inside Work in any Climate.

Bell's Asbestos Aquol Paint is equally suitable for the finest decorative work as well as for general painting. It can be applied over or under any other paint, and, owing to its easy application, can be used with a large distemper brush; the SAVING THUS EFFECTED IN LABOUR BEING **50** PER CENT. OVER THAT OF LEAD PAINTS.

Bell's Asbestos Aquol Paint is susceptible of the most delicate treatment; and, owing to its perfect flatted surface, it brings up the varnish in a manner that no other paint can equal. ONE COAT OF VARNISH ON **Bell's Asbestos Aquol** IS EQUAL TO TWO COATS ON ORDINARY PAINT.

BELL'S ASBESTOS AQUOL PAINT is specially adapted for Private Houses, Exhibition Buildings, Ships, Churches, Asylums, School Boards, Railway Stations, and all work of Wood, Iron, Cement, Plaster, Stone, Brick, &c., &c.

Those who Study Economy and Protection from Fire should use only

BELL'S ASBESTOS AQUOL PAINT.

BELL'S ASBESTOS AQUOL PRIMING is made Ready for Use.
BELL'S ASBESTOS AQUOL PRIMING stops all suction of Wood, Cement, Plaster, &c.
BELL'S ASBESTOS AQUOL PRIMING should be applied to all New Work.

Suitable for Ceilings, Walls, and New Wood, and is very durable.

BELL'S ASBESTOS AQUOL KNOTTING, for Stopping Knots in New Work.

AN EXCELLENT CURE FOR DAMP WALLS.

Colour Cards and Price Lists on Application.

Supplied in Casks of 5 to 7 cwt., and Iron Drums of 28, 56, and 112 lbs., Sample Tins of 7 and 14 lbs.

Owing to its Covering Capacity, a SAVING IN FREIGHT of 40 per cent. is effected for a given surface.

BELL'S ASBESTOS COMPANY, LIMITED,

SOUTHWARK, LONDON, S.E.

DEPOTS—MANCHESTER: Cable Street, Blackfriars. LIVERPOOL: 2, Strand Street, James Street. HULL: Humber Dock Basin. GLASGOW: 35, Robertson Street. DUBLIN: 2, St. Andrew Street. AMSTERDAM: 264, N. Z. Voorburgwal. BERLIN, BARCELONA, and ANTWERP.
AGENTS—BIRMINGHAM: BELL and Co., 7, John Bright Street. CARDIFF: BELL and Co., West Bute Street.

BELL'S ASBESTOS DAGGER PACKING

PATENT No. 15,493.

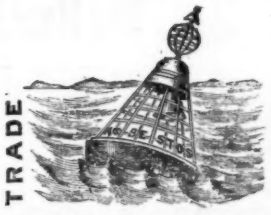
SQUARE. Every 10 feet has Label as above, and bears our Trade Mark.

Under this registered title are included the inventions of Mr. Field; and experience has proved them to be the MOST EFFICIENT DURABLE, and ECONOMICAL PACKINGS ever made. They constitute such a combination of Asbestos and India-rubber as secures the maximum of elasticity and heat resistance; and they are, therefore, UNEQUALLED FOR EVERY KIND OF ENGINE. These Packings are being universally used by most of the leading Steamship Companies throughout the world for ordinary Compound, Triple, and Quadruple Expansion Engines of the latest types. The packings are composed of rolled Asbestos Cloth, but the India-rubber is placed in two forms to suit various cases.

IN ORDERING STATE WHETHER SQUARE OR ROUND IS REQUIRED.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
GLASGOW: 35, Robertson Street.
DUBLIN, BERLIN.



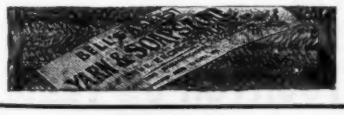
DEPÔTS.
AMSTERDAM: 264 N. Z. Voorburgwal,
BARCELONA, and ANTWERP.

AGENTS.
BIRMINGHAM: BELL and Co., 7, John Bright Street.
CARDIFF: BELL and Co., West Bute St.

SOUTHWARK, BELL'S ASBESTOS. LONDON, S.E.

BELLS ASBESTOS YARN AND SOAPSTONE PACKING

Is the BEST LOCOMOTIVE PACKING made.

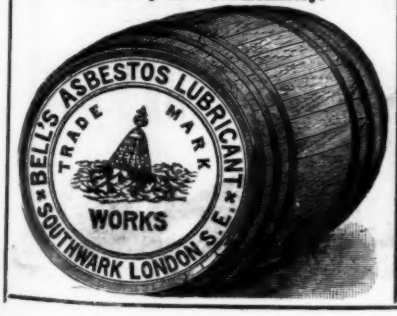


BELL'S COMPOUND HYDRAULIC PACKING

Is specially suited for Hydraulic Machinery, Accumulators, and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT

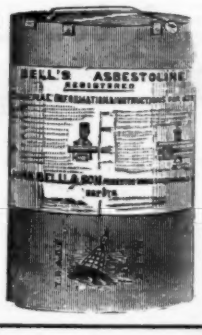
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



BELL'S ASBESTOLINE

The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.



ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.

Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS EXPANSION SHEETING

RINGS, AND TAPE.

Is the most efficient and reliable Material for Manhole, Mudhole, Steam-Pipe, and all other Joints.

BELL'S ASBESTOS NON-CONDUCTING COMPOSITION.

Will reduce loss by radiation, and saves 40 per cent. of fuel.

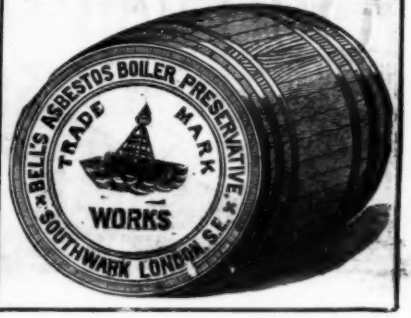
Is suitable for boilers with flat or round bottoms. Is superior to any other, and saves its cost in a few months.

Is sent out dry in bags; therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS BOILER PRESERVATIVE

Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



PATENT GALVANIZED ROOFING.

Specially Suitable for Gas-Works.

G. R. HISLOP, Gas Engineer, Paisley, writes:—

"I have much pleasure in certifying entire satisfaction with your Patent Galvanized Arc Sheet R ofing with Steel Tube Joints, as supplied and erected by you here last autumn.

"While presenting a much more pleasing and substantial appearance, your system is in other respects more satisfactory than the ordinary Corrugated Iron; and such being the case, it is proposed to adopt it for other Roofs yet to be erected.

"*March* 5, 1890."

We contract to cover Buildings with our Patent Roofing on any Iron or Wood Framing, or supply and erect complete Buildings or Roofs.

Gas Engineers are invited to ask us for Plans and Estimates.

No Holes in these Sheets.

Always Water-Tight.

The Iron and Steel Fencing and Buildings Company, Limited,

109, ST. VINCENT STREET, GLASGOW,

Manufacturers of Tanks, Cisterns, & Fencing Material.

"THE METEOR."

NEW HIGH-POWER GAS-LAMP.

Westphal's Patent.

Gas Companies should hire these Lamps to their Consumers, and introduce them for Street Lighting as a rival to the Electric Light, as they do not get out of order, are most economical, and the Burner being a circular slit does not choke up.

Particulars and Prices Free.

HENRY GREENE & SONS,

SOLE CONSIGNEES FOR GREAT BRITAIN & COLONIES,

153 TO 155, CANNON STREET,

LONDON BRIDGE, E.C.

Gas-Bags for Mains. **High-Water Boots.** **Woollen Miners' Jackets.**

Delivery and Suction Hose, Gutta-Percha Acid Bottles, Leather Driving Bands, Woven Canvas Hose for Fire-Engines, Wedge and Square Gas-Bags, Air and Water Beds for Invalids, Oil Tarpauling Coats, Trousers, Hats, &c., Squeegees for cleansing Pavements, &c., Billiard and Bagatelle Cush, Tricycle Tyres, Leather Hose, Cotton Waste, Engine Cloths, Oils, &c., India-rubber Waterproof Garments for Walking, Driving, or Sporting Wear, Diving and Wading Dresses, Printers' Blankets, Iron Wheels and Rollers covered with India-rubber, and Stokers' Gloves.

Write for Price List to

THOMAS BUGDEN, Manufacturer,

116 & 118, GOSWELL ROAD, LONDON, E.C.

OXYGEN, OXYGEN, OXYGEN.

(Extracted from the Atmosphere by **Brin's Patent Process.**)

40,000 cubic feet always in Stock.

Managers of Gas-Works supplied with Oxygen compressed in Weldless Steel Cylinders, for experimental purposes, &c., at special rates.

Estimates given for the erection of Oxygen Producers in Gas-Works, &c.

Managers of Gas-Works specially invited to inspect our Works.

The Manchester Oxygen (BRIN'S PATENT) Co., Ltd.,

GREAT MARLBOROUGH ST., OXFORD ROAD,

MANCHESTER.

Manufacturers and Compressors of all kinds of Gas.

JOHN BROWN & CO., LIMITED,

ATLAS STEEL AND IRON WORKS, SHEFFIELD,

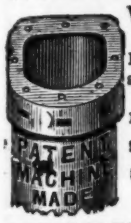
ALDWARKE MAIN GAS COAL.

This Coal yields 12,600 feet of 19-candle gas per ton.

Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

ASHMORE, BENSON, PEASE, & CO., LTD., STOCKTON-ON-TEES.

WILLIAM INGHAM & SONS,



WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

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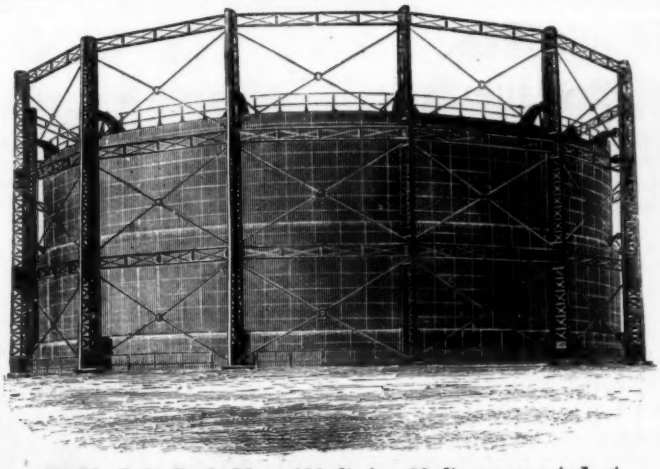

Treble-Lift Gasholder, 130 ft. by 66 ft., as erected at Burton-on-Trent, 1889.

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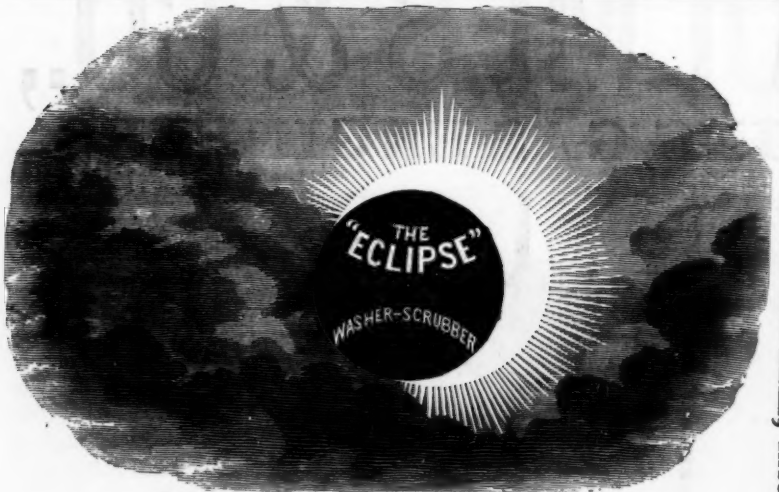

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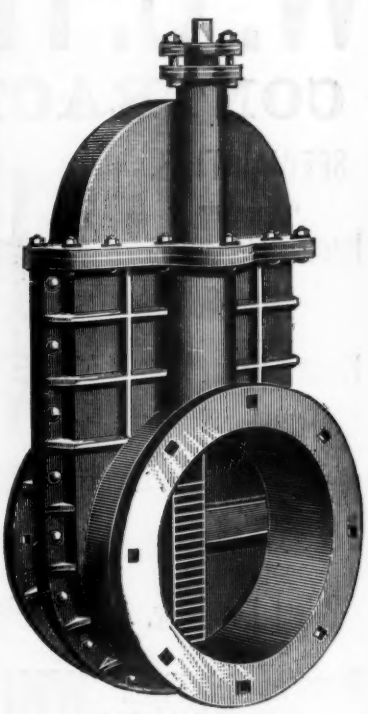
SILVER MEDAL, Inventions Exhibition, 1885.



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